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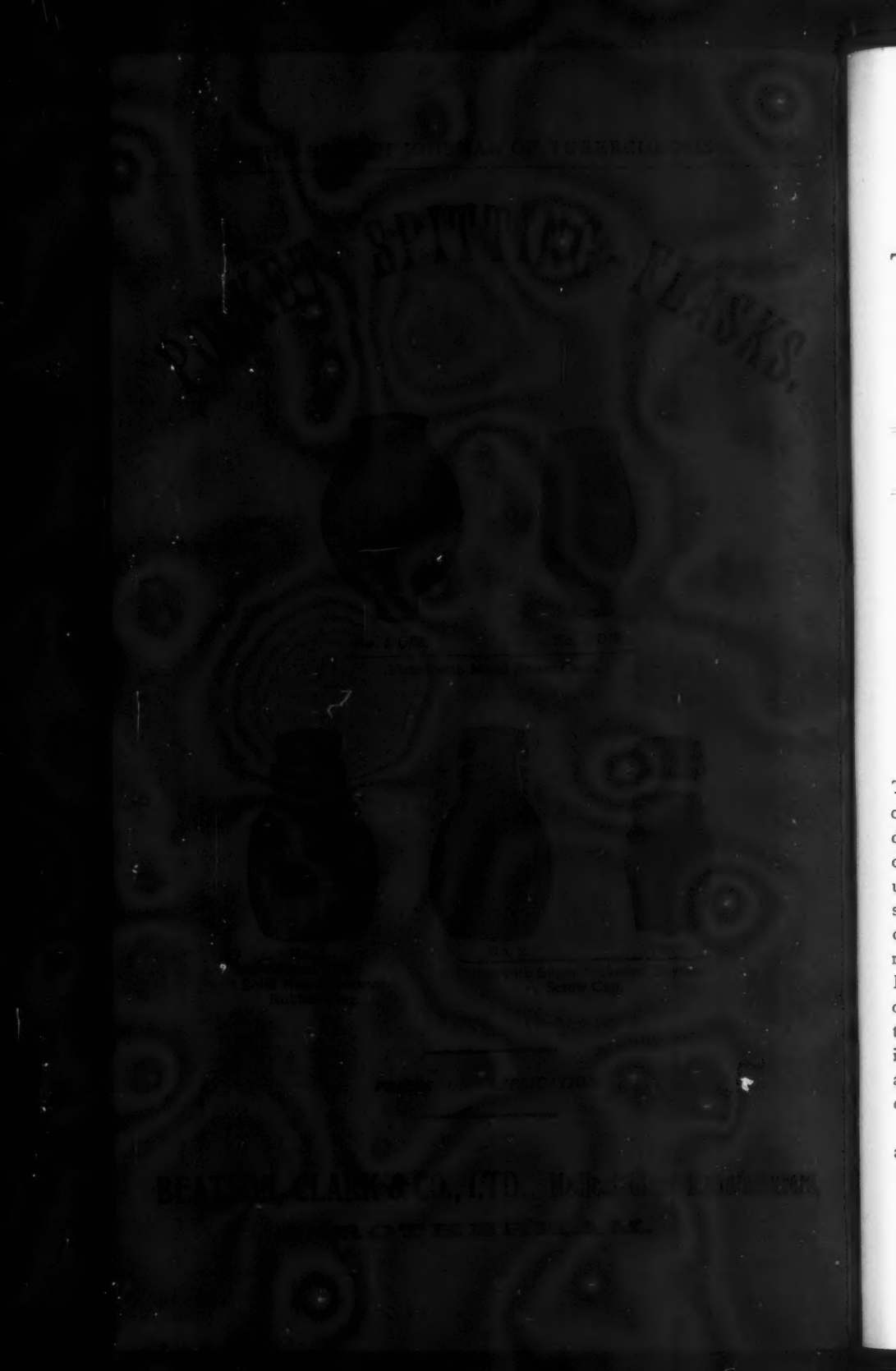

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ORIGINAL ARTICLES.

A SYSTEM OF CLASSIFICATION OF PULMONARY TUBERCULOSIS.

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The classification of cases of pulmonary tuberculosis is the very basis of clinical work in connection with this disease, inasmuch as it determines the treatment, the prognosis, and, for the purposes of tuberculosis schemes, the "disposal" of cases, the word "disposal" being used to mean the decision as to whether the patient shall be sent to sanatorium or hospital, or kept at home on "dispensary" or "domiciliary" treatment. But it is also of supreme, though insufficiently realized, importance in connection with the epidemiology of the disease. For it must be clearly recognized that the proportionate distribution of clinical types of phthisis differs profoundly in different areas throughout the British Isles, and that these clinical differences are of great interest and importance in connection with "phthisiogenesis," whether approached from the clinical, the physiological, or the statistical point of view.

Some years ago, being at that time chiefly interested in this latter aspect of the question, the author attempted to formulate for his own

use a working classification of pulmonary tuberculosis that should answer three fundamental questions about each case. These questions were as follows: (1) Is the disease in an "acute initial" or a "chronic recrudescent" stage? (2) What is the anatomical extent of the disease? (3) What is the state of *balance* between infection and resistance? To obtain answers to these questions, it was clearly necessary to define the terms a little more closely.

There were two systems of classification ready to hand. The question of anatomical extent could be answered in terms of the "international" classification; while a simple and practical division of cases in terms of their individual "balance" was found in Inman's classification, based on temperature as an index to auto-inoculation. While the terms "acute initial" and "chronic recrudescent" almost explain themselves, I found it necessary, if my questions were to be answered on uniform lines, to formulate for these headings precise definitions. The classification scheme, together with definitions and explanatory examples, is as follows:

Cases are divided and subdivided—

Firstly: On the history and duration of the disease into—

A. *Acute Initial Group.*—A case is to be regarded as "acute and initial" when the progress of the illness has been continuous from the start, without healthy intervals of any considerable duration. If the disease has continued to progress for more than two years it ceases to be "acute and initial," and passes into the "chronic or recrudescent" group for purposes of classification.

C. *Chronic or Recrudescent Group.*—A case is regarded as "chronic or recrudescent" when there have been previous signs of tuberculous infection, such as hæmoptysis, pleurisy, bone, joint, or gland disease, abdominal or pulmonary infection, *but where these have been separated from the present illness by periods of relatively good health.* All cases of over two years' duration are to be classified under this heading. It should be noted that *acute exacerbations* in the course of chronic tuberculosis fall into Group C.

Secondly: On the anatomical extent of the lessons (International Classification) into—

1. *Minimal.*—Disease of slight severity, limited to small areas of one lobe.

2. *Moderately Advanced.*—Disease of slight severity, more extensive than (1), but affecting at most the volume of one lobe; or severe, extending at most to the volume of one half lobe.

3. *Far Advanced.*—All cases extending beyond (2), and all such with considerable cavities.

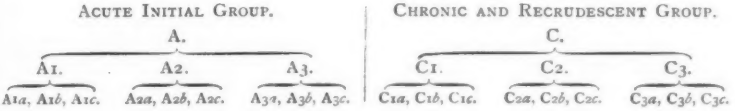
Thirdly: On the constitutional balance (Inman's Classification) into—

Stage.	Clinical.	Pathological.
a.	*Resting febrile.*	Excessive auto-inoculation occurring spontaneously.
b.	*Ambulant febrile.*	Excessive auto-inoculation inducible by exercise.
c.	*Ambulant Afebrile.*	Appropriate auto-inoculation inducible by exercise.

Examples.—A case of initial disease with lesions involving both upper lobes, and with pyrexia even when at rest, would be A3*a*. A case of right apex trouble in an adult with a history of hæmoptysis three years ago, with no pyrexia at rest, but a rise to 101° F. on exercise, would be C1*b*.

N.B.—If there is any serious complication, this should be writte n after the classification—as, for instance, C3*a* (*laryngitis*).

CLASSIFICATION SCHEME IN DIAGRAM.



On arrival in Wales, the author submitted this classification in its original shape—it has since been modified in detail—to his colleagues of the medical staff of the Welsh National Memorial Association, and owes them a debt of gratitude, not only for their courtesy in accepting it in general terms for application in their clinical records, but also for many helpful suggestions and for the personal care and trouble which they have taken in filling up the epidemiological enquiry cards distributed in connection with the scheme.

The advantage of the method is that, by means of a simple formula of three elements, it is possible to obtain a fairly satisfactory visualization of the state of the patient at any given time. A3*a* means that the patient was quite well and had had no previous symptoms of tuberculosis up to two years ago, that he is now suffering from far advanced pulmonary disease, and that the infection is so much in excess of the resistance that there is pyrexia even when at rest. Cases of this kind are most often met with in adolescence and young adult life, and they tend to a fatal termination. They are common where rural conditions have recently been invaded by industrial enterprise, or where members of primitive communities are brought for the first time in contact with "carriers" of the tubercle bacillus. As a clinical type, they lie behind John Brownlee's "young adult" type of death-rate. C2*b*, on the

other hand, implies that the patient has had previous signs or symptoms —often slight—of infection, that the disease is moderately advanced, and that the balance of resistance, though easily disadjusted by exercise, is redressed by keeping quiet. A1*c* means that such disease as there is has not been manifest for long, that it is minimal in anatomical extent, and that the balance of resistance is still in the patient's favour.

This classification is closely similar to several others. If the grouping into "acute initial" and "chronic recrudescent" types is omitted, what remains is, to all intents and purposes, common to all the more generally used classifications. Both anatomical extent of disease and "constitutional symptoms" are taken into account by Sir Robert Philip, by Dr. F. R. Walters, by the Society of Medical Superintendents, by the American Sanatorium Committee, and in the classification recently advocated by the Ministry of Health.

The basis of the "anatomical" differentiation is, in all of the above, the International Classification, although minor alterations or amplifications are suggested in most of them. It is unlikely that anybody ever attempts to adhere quite strictly to the definitions of the International Classification or its modifications. These are used as rough guides, or as bases for occasional reference. For the experienced clinician, the words used by the American Sanatorium Committee—"minimal," "moderately advanced," and "far advanced"—suffice, and I have stolen these well-chosen words for use in my own system. In all, the need to supplement "anatomical extent" by an evaluation of the degree of toxæmic disturbance is fully recognized, and an attempt is made to introduce this factor. In none of them is the system of classifying the constitutional disturbance so satisfactory or scientific as that devised by Inman.

It is a source of surprise to the author that this simple and effective method is not much more widely known and used by medical men. Its only defect, and that a minor one, is that it speaks of the "ambulant afebrile" type as associated with "appropriate auto-inoculation," a reference to the theory of treatment by graded exercise and work rather than an attempt at accurate definition. It would be more correct, for the purposes of clinical classification, to speak of this group as having "no appreciable auto-inoculation inducible by exercise," since there is no evidence of "appropriate auto-inoculation" except, perhaps, a steady improvement, best appreciated if the patient is at a sanatorium. For practical purposes, a case classified as to "anatomical extent of disease" and degree of constitutional disturbance on any one of the systems quoted may be fairly correctly "translated" into terms of any other of them.

An important point of difference between the system now described and the others is that there is a preliminary grouping of the cases into "acute initial" and "chronic recrudescent." The object of this is rather "epidemiological" than "clinical," though it has a clinical bearing also. The main idea is that the pyrexial subdivisions of the "acute primary" group represent a formidable and fatal type of "galloping consumption," much more common in these islands twenty years ago than to-day, much commoner amongst females than males, amongst adolescents and young adults than middle-aged and elderly persons, and amongst the inhabitants of rural than those of metropolitan areas. The "chronic recrudescent" types, on the other hand, especially those that are *not* associated with marked pyrexia, would appear to be commoner in middle age, in the male sex, and in urban areas. But it is upon the wide collection and comparison of such records throughout these islands that inferences as to the factors determining clinical type in phthisis must ultimately be based. Statistics of deaths by age and sex have a great range of utility, but can never cover the whole field of this intricate disease.

The author has already received valuable help from Dr. L. S. T. Burrell of the Brompton Hospital, and Dr. R. S. Wingfield of the Brompton Sanatorium at Frimley, which has enabled him to make a preliminary comparison between the percentages of the clinical types under treatment in hospitals and sanatoria in Wales with those in typical residential institutions in or near London. The results tend to show that the proportion of "acute initial" phthisis is greater in Wales than in London, and that it occurs earlier in life. These results are in accordance with the findings of John Brownlee as to the distribution of the "young adult" type of death-rate. The total numbers compared were, however, too small to justify serious statistical examination, nor can a comparison based on "patients in residential institutions" be of much real value, since such local circumstances as "numbers of available beds" and "numbers on waiting list" introduce factors of error.

An attempt is now being made to collect information, not from the residential institutions only, but also through the area tuberculosis physicians for all the cases seen by them throughout Wales. For this purpose, an "Epidemiological Enquiry Card" has been brought into use, the headings of which are here illustrated. If any tuberculosis specialists working elsewhere are sufficiently interested to participate in this enquiry, the author would be only too happy to supply further information and samples of the "enquiry cards" in use.

EPIDEMIOLOGICAL ENQUIRY CARD No. 1.

W.N.M. ASSOCIATION.

Name ..... Classification.....
Age..... Duration of Illness.....
Sex ..... Date of Examination .....
Place of Birth .....
Place of Upbringing .....
Present Residence and Place of Work ..... Sputum T.B. Present. / T.B. Absent.
(If brought up elsewhere, date of leaving home)
Occupation .....
Family History.....
Has there been association with infected persons?.....
If so, with whom.....
„ when.....
„ where.....

REMARKS ON CASE.

Signed.....
Tuberculosis Officer or Medical Superintendent.

N.B.—This card to be filled up for all cases of Pulmonary Tuberculosis and posted to P.M.O., Welsh National Memorial Association.
Classification used should be that enclosed. Fresh copies of Classification and Enquiry Cards can be obtained on application to Head Office.

TUBERCULOSIS WORK IN ENGLAND.[1]

BY A. SALUSBURY MACNALTY,

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THE interest of the State in tuberculosis dates from the early days of health organization in England. Sir John Simon enlisted Sir John Burdon-Sanderson's aid in carrying out experiments which confirmed those of Villemin, and announced the finding in his reports to the Privy

[1] Abstract of an address delivered before the Tuberculosis Society on January 18, 1924, and published *in extenso* in the *Lancet* of January 26. The earlier part of the address included a brief account of the pioneer work in tuberculosis effected by voluntary measures, work which was watched by the State with ever-increasing attention.

Council in 1867 and 1868. Much research was also carried out by Klein, Buchanan and others for the Local Government Board. A Departmental Committee was appointed in 1888 to deal with the question of tuberculosis in cattle; Royal Commissions in 1891, 1894, and 1896 considered the effect on human health of the consumption of food (including milk) derived from tuberculous animals. Then came the Royal Commission on Tuberculosis in 1901, which worked for ten years, and published a valuable series of reports on the subject of both human and bovine tuberculosis. In 1908 the late Dr. H. Timbrell Bulstrode made an important report to the Local Government Board upon public sanatoria existing in this country for cases of pulmonary tuberculosis. We may concisely summarize recent progress in the following paragraphs:

Establishment of the School Medical Service.—The establishment of the School Medical Service by the Board of Education in 1907 influenced the prevention and treatment of tuberculosis in the child; the service has already secured a great reduction in the incidence of tuberculosis in children of school age.

Notification.—Beginning with the encouragement of voluntary notification of tuberculosis in 1907, the Local Government Board proceeded to compulsory notification by successive stages. In 1912 notification was made compulsory for all forms of tuberculosis.

The National Insurance Act and the Departmental Committee.—The National Insurance Act, 1911, dealt as regards tuberculosis in insured persons with (*a*) treatment, (*b*) erection of sanatoria and other institutions, (*c*) research, and (*d*) education. The Departmental Committee on Tuberculosis appointed in 1912 surveyed the whole field of tuberculosis, and advised (1) that any scheme which is to form a basis for the control of tuberculosis should be available for the whole community; and (2) that the organization of schemes throughout the country can best be carried out if undertaken by local authorities.

Tuberculosis Schemes for England under the Local Government Board.—The findings of the Departmental Committee were generally agreed to by the Local Government Board, which now urged every county council and county borough council to formulate a scheme for the treatment of cases of tuberculosis within each area. Financial grants were made by the Government for the treatment of non-insured persons, and capital grants were given also for the establishment of dispensaries, sanatoria and hospitals. The Public Health (Tuberculosis) Act, 1921, devolved the provision of sanatorium treatment upon local authorities, and put an end to the artificial distinction between the insured and the uninsured tuberculous patient. In practice a complete scheme approved by the Local Government Board would provide for: (1) The medical officer of health of a county council or county borough

as chief administrative officer; (2) tuberculosis medical officers, appointed by the local authorities; (3) dispensaries, including a system of health visiting; (4) sanatoria for early cases; (5) hospitals for intermediate and advanced cases. Under the National Insurance Act, insured persons suffering from tuberculosis could be treated in their own homes by the panel medical practitioner (domiciliary treatment).

Tuberculosis Administration During and After the War.—The war adversely affected the national campaign against tuberculosis and delayed the progress of tuberculosis schemes. In the closing years of the war the high incidence of tuberculosis in the ex-service man claimed attention. The Ministry of Pensions now make themselves responsible for the entire cost of treatment of the tuberculous ex-service man; for this treatment more beds in sanatoria were provided by the local authorities. In 1919 the Inter-Departmental Committee on Tuberculosis (Sanatoria for Soldiers) reported favourably upon the establishments of training colonies and of permanent village settlements for ex-service men. Vocational training centres for ex-service men have been provided at certain sanatoria at the cost of the Government.

The Ministry of Health.—The establishment of the Ministry of Health in 1919 co-ordinated the public health services. For the first time a special medical department of the Ministry solely concerned with tuberculosis was set up, of which Dr. F. J. H. Coutts, C.B., is the head. Central control was at once made more unified and comprehensive in regard to tuberculosis schemes.

Medical Progress in Tuberculosis.—A tuberculosis service is being carried out in 442 dispensaries by 349 tuberculosis officers. There are 441 residential institutions with a total number of 19,386 beds approved by the Ministry of Health (as at March 31, 1923). Tuberculosis schemes should incorporate every recent advance in treatment of the disease. The Ministry of Health is acting in co-operation with the Medical Research Council, particularly in investigating the scientific bases for the treatment of surgical tuberculosis, and the use of heliotherapy, artificial pneumothorax, X-rays, sera and vaccines in tuberculous cases.

Care Committees, Training Colonies, and Village Settlements.—There is need for more care committee work and for the furtherance of sociological work in tuberculosis. There is ample scope for the development of training colonies, village settlements, and industrial workshops in urban centres.

Conclusion.—Statistics indicating the fall in the death-rate from tuberculosis, especially in recent years, together with Dr. Stevenson's recent dictum, suggest that for a continued increase in the relative rate of fall we must look for evidence of the effect of the anti-tuberculosis measures of recent years.

SOME ASPECTS OF THE SURGICAL TREATMENT OF PULMONARY TUBERCULOSIS.

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Sanatorium treatment with the hygienic conditions, the routine, the rest, and the graduated exercises, is the most widely recognized method of combating intra-pulmonary tuberculosis. It has, however, very great limitations. It can often arrest the disease in its earlier stages; the arrest may be permanent, but when the conditions to which the patient returns are unfavourable there is great tendency to relapse. In the more advanced cases sanatorium treatment can produce temporary improvement, and so prolong life. In those cases in which the tuberculous trouble has become complicated by extensive bronchiectatic changes, it can, at the most, produce only slight relief of symptoms.

Because of these limitations numerous attempts to discover some remedy, either as a substitute or as an accessory to sanatorium methods, have been made. In every instance enthusiasm has waxed and then waned until artificial pneumothorax entered the lists; to be ignored at first, then treated with opprobrium, then tolerated, and finally accepted by a steadily increasing majority, as the evidence of its success, proclaimed by medical exponents and patients, became more and more unavoidable.

The much greater advantages obtained with a complete pneumothorax as compared with those obtained with a partial one, limited by bands, resulted in the means being devised for the division of these adhesions. The success of collapse of the lung by pneumothorax, and the frequent failure of arrest when this was impracticable because the pleural membranes were adherent, led to the introduction of the major surgical procedures for the collapse of the lung by apicolysis and by thoracoplasty. Here, again, success is claiming recognition, and is surely, though slowly, obtaining it.

For the consideration of the surgical treatment of chronic pulmonary tuberculosis, the disease may be divided into three stages: (1) The early stage, during which contraction of the surrounding walls and emphysema of the healthy lung can compensate fully for the contraction of the pathological fibrotic tissue formation. (2) The

stage during which the fibrosis has increased beyond the capacity of the body to compensate, and secondary infection is complicating the picture. Because of these conditions, further changes are developing, which will lead sooner or later to the establishment of stage (3), in which cavity formation and bronchiectactic conditions are well marked, and the secondary infections associated with these dominate the clinical picture. Each stage glides imperceptibly into the other; the disease may be at stage 1 in one part and at another stage in another part. Hæmorrhage may occur at any period of the disease. The more advanced the stage, the more serious is the bleeding likely to be.

The purpose of all surgical treatment is to collapse the lung, and the object of collapsing the lung is: (1) To arrest hæmorrhage. (2) Relatively to increase the patient's resistance by diminishing the virulence of the tubercle bacilli. (3) To abolish the cough and sputum, thereby reducing the danger of infecting other organs (*e.g.*, the larynx and intestines), and removing the risk of infecting other individuals. (4) To obliterate cavities, whether dilated bronchi or cavities in the lung parenchyma; thereby preventing the retention of secretions and the consequent absorption of toxins.

If one lung is mainly affected and the other shows the presence of disease spreading in it from the hilum, the treatment by collapse of the former will exert a definitely beneficial effect on the latter. Total collapse is effected by artificial pneumothorax in the absence of adhesions or by thoracoplasty. Localized collapse is produced by apicolysis, by a localized thoracoplasty, and by paralyzing one dome of the diaphragm.

Inasmuch as the simplest and safest methods must always be employed, a pneumothorax is always attempted in preference to thoracoplasty. The success or failure of pneumothorax depends on the absence or presence of adhesions, and this cannot be foretold. The results obtained by complete collapse by pneumothorax are so immeasurably superior to those following partial collapse that the adhesions which interfere with a complete pneumothorax must always be divided if possible. This is not practicable when the pleural membranes are adherent over a wide surface, but is feasible if the adhesions appear, on radiological examination, as bands. When multiple bands exist, and it is difficult to estimate their size, their direction, and position, a more accurate knowledge may be obtained by the use of the thoracoscope.

The division of bands can be done by a special tenotome. The tenotome is passed into the pleural cavity through an intercostal space, and is guided up to the adhesion by X-ray illumination, which shows on the screen both tenotome and band. When the blade comes in contact with the adhesion, it is pressed against it, and made to cut

it by sawing movements. Alternatively, division can be done by the electric cautery, which is passed into the pleural cavity through a cannula. In this case vision of the cautery and band is obtained through a thoracoscope inserted through an adjacent intercostal space. When there are multiple broad adhesions, it is wiser to open the chest and to divide these between ligatures, This procedure may be followed by an effusion. Repeated aspiration will then be necessary until the wound is firmly healed, since if the liquid comes in contact with the wound a sinus will result.

Thoracoplasty is the alternative to pneumothorax for producing total lung collapse. It is a more serious affair, and the collapse is permanent. For these reasons it is essential that there should be much greater rigidity exercised in the selection of cases. While some surgeons abroad do a thoracoplasty when there are signs of activity in the sounder lung, I personally insist that there shall be absolute quiescence of the disease in that lung.

Removal of the whole of the ribs increases the danger of mediastinal flutter. The safest and most satisfactory collapse is obtained by removing the posterior portions of the ribs *right up to* the transverse processes. Portions of the first ten ribs should be excised, always including the first, if total collapse is desired. The ribs are reached through a paravertebral incision which curves out to the posterior axillary line over the lower ribs. Whilst I nearly always do the operation in one stage, many surgeons prefer to do it in two, excising the lower ribs at the first. The more completely shock is abolished, the safer it becomes to complete the operation in one stage. To this end I anæsthetize the whole of the area of operation with 2 per cent. novocaine, and in addition inject 5 min. of absolute alcohol into each intercostal nerve. Sufficient chloroform only is given to keep the patient unconscious. The resulting deformity of the chest wall is easily concealed by the clothes. The following extracts from a letter of a patient of mine, dated December 24, 1923, on whom I had done the operation in September, 1921, is by no means atypical of the results which may be anticipated: "I am putting in quite a decent day now. I leave home at 8.12 and leave business usually just after 5 o'clock: of course, I don't work too hard, but I am finding it coming easier." He states also that he has had two weeks only off work in the last twelve months, yet before the operation the whole of one lung was in stage (3).

The operation of apicolysis is particularly suitable for those cases in which the disease is confined to the upper lobe, which has become densely fibrosed or contains a cavity. An incision is made over the second costal cartilage, which is excised together with a small adjacent portion of the rib. The posterior periosteum is divided and the parietal pleura exposed. This is then stripped by the finger from off the inner

surface of the chest wall over the whole of the upper lobe. This area of the lung collapses and the pleura is carried with it. The space thus formed can be filled either with paraffin or with fat. The former is not satisfactory as it may give rise to an extra-pleural effusion, which eventually forces its way through the wound and carries the paraffin with it. In women who have a fair covering of fat on the chest wall, I dissect up a flap of this together with part of the breast, but leaving the flap attached to the margin of the incision. This flap is then turned over and tucked into the space formed by the collapse of the lung, and the wound closed.

Section of the phrenic nerve in the neck is followed by paralysis of the one dome of the diaphragm in about 80 per cent. of cases. This allows of a partial collapse of the base of the lung. This paralysis is also particularly useful in abolishing the incessant dry, irritating cough which may develop during artificial pneumothorax treatment, when the lung is adherent to the diaphragm. It may also reduce greatly the vomiting which in some patients is a constant accompaniment of bouts of coughing.

THE TREATMENT OF TUBERCULOSIS BY TUBERCULIN.

By WILLIAM M. CROFTON,

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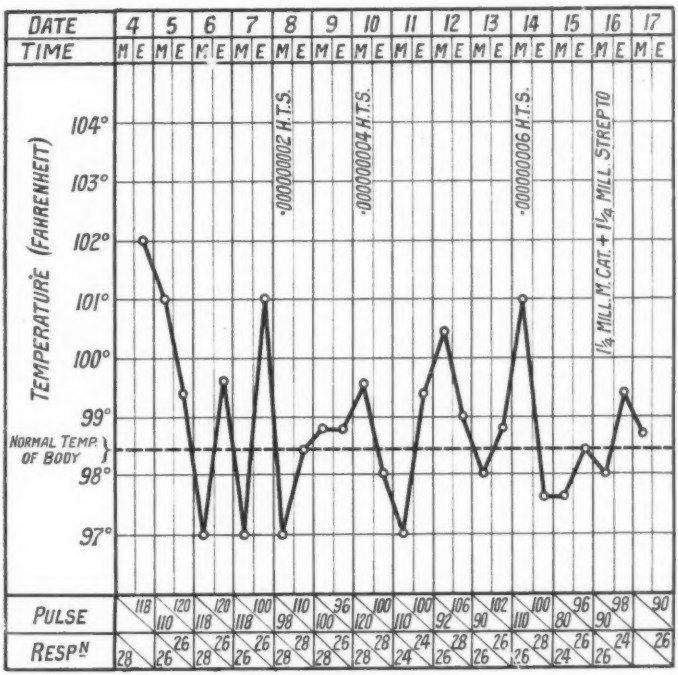
The fear of tuberculin is, I hope, now slowly dying. The reasons for its disuse have been several—viz., the disasters produced by its misuse in Koch's time, the fear of lighting up a quiescent lesion, and finally, amongst those who have used it, the failure to achieve anything but partial results. In order to achieve success in therapeutic immunization, as I have continuously pointed out now for nearly twenty years, certain factors are necessary: (1) The patient must be able to respond to the stimulus; (2) the antigen must be of good quality and complete; (3) it must be given in proper doses; (4) and at proper intervals.

1. There is only one condition in which a patient is incapable of responding to an antigenic stimulus—that is, when the resistance of the endothelial cells of his capillaries is broken down by an overwhelming sudden assault of the invading microbe, as in acute hæmorrhagic infections, or slowly, in such an infection as chronic phthisis.

It is quite generally thought that in acute cases or in cases with fever that microbial antigens must not be used. This is especially so

with tuberculin; indeed, until some years ago it was my practice as a rule not to start tuberculin until the temperature was brought to normal by antigens of the catarrh-producing microbes and intravital germicides. Now I find it better to start at once with the initial dose of tuberculin, alternating the doses of tuberculin and catarrh antigen as soon as they are made. This has worked very well. Logically one ought to give the complete antigen together, but the benzoyl chloride solution of the tubercle bacillus (H.T.S.) and the watery suspensions of



the catarrh microbes do not mix, and are better inoculated separately. There is really no reason why the two inoculations should not be at the same time.

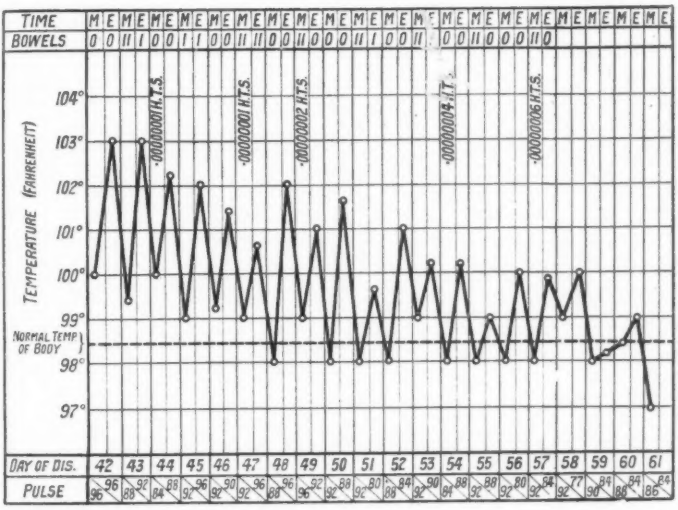
So great has been the feeling that patients with temperatures cannot be actively immunized that huge sums of money have been spent on the manufacture of anti-microbial serums, which even in the case of such specific infections as pneumococcal pneumonia and meningococcus-meningitis give only partial results, and nothing comparable to the results obtainable by active immunization with autogenous antigens. The same may be said about the serum treatment of

puerperal fever. I wonder if the use of anti-streptococcal serum has reduced the death-rate by even 25 per cent. Active immunization with autogenous antigens has given me so far practically 100 per cent. recoveries. I suppose that it was this fallacy that induced Spahlinger to produce his serum for the treatment of phthisis. Serum is peculiarly unsuitable for the treatment of chronic infections owing to the danger of anaphylaxis. Many years ago I tried both Marmorek's and Maragliano's serum, but soon abandoned them owing to this complication. So very much better are the results by active immunization that the manufacture of all serums, with the exception of the anti-exotoxic serums, may safely be abandoned.

2. In order to survive in an animal body a pathogenic microbe must develop a ferment (toxin) or ferments by which it can prepare its food by killing living protoplasm. If it does not do this it is not pathogenic; it is saprophytic, living on the waste products of the body, or symbiotic. If it is pathogenic and the body contains or makes sufficient antitoxin, then the microbe cannot survive, and since in this process of antitoxin formation adapters (immune body, co-ferment, etc.) are inevitably made for the digestion of the microbial body, a patient with sufficient antitoxin is completely immune, since phagocytic cells can certainly ingest and digest the microbe, and can survive the digestion of it, since the endotoxin thus liberated is neutralized by antitoxin. In enteric fever serum was tried but did not contain sufficient antitoxin, so that a considerable solution of microbes took place with the sudden liberation of toxin, to neutralize which there was insufficient antitoxin, the patient being made seriously worse. It is therefore essential that the production of not only anti-microbial ferments (adapters) should be induced, but that the production of sufficient antitoxin should be induced also. How can this possibly take place if there is little or no specific toxin in the antigen? A very large number of stock antigens are quite, or almost quite, useless for this reason, their toxic content having been reduced by repeated subculture on media which contain nothing to stimulate the microbe to produce toxins, or the toxic contents is reduced by heat or alkali, and this detoxication is advertised as a virtue instead of a vice.

It is generally agreed that the tubercle bacillus has acquired its wax-saturated constitution as an additional defence against the animal body, and this has made a difficulty in producing a satisfactory antigen. It is clear that if the antigen is to be complete it must contain this waxy or fatty substance. Koch tried to overcome the difficulty by using filtrates of old broth cultures in which autolysis had taken place. Von Ruck extracted the fats and then replaced them in suitable proportions. Recently Douglas and Dreyer, apparently to overcome the difficulty, have removed them altogether or nearly altogether. For

what reason it is hard to discover, for it is essential to induce antibodies to this fatty constituent, just as it is essential to produce antibodies to the protoplasm and ferments of the tubercle bacillus. Human type tubercle bacillus solution (H.T.S.) is a complete antigen. Being a complete solution of virulent tubercle bacillus in benzoyl chloride it contains everything that the tubercle bacillus does free for the induction of antibodies to all these substances when injected into the



animal body. I have satisfied myself that it is the most complete and powerful tubercle bacillus antigen yet produced. I think it will be difficult to find an antigen that will give therapeutic results in smaller doses. There is no mystery about its production. A description of its method of manufacture will be found in my book "Pulmonary Tuberculosis";[1] nor has this method been patented. Again, it is not rational to expect to cure a mixed infection such as open tuberculosis is with a single antigen—that is, with tuberculin alone—as so many expect to do. I hold that it is absolutely essential to use autogenous antigens of the catarrh-producing infections, or in bone or joint tuberculosis, septic infections, or rheumatic infections so constantly present.

3 and 4. In a discussion on the early diagnosis of tuberculosis at the Scarborough Conference of the Royal Institute of Public Health it was stated that any dose of tuberculin which, given under the skin, would give diagnostic reactions would be dangerous, lighting up the disease

[1] Crofton, W. M.: "Pulmonary Tuberculosis: Its Diagnosis, Prevention, and Treatment." London: J. and A. Churchill. 1917. Price 6s. net.

to an uncontrollable extent. Of course it might if unsuitable dosage was used. A third of a grain of strychnine would do considerable damage. But I have never known anything but good result from the doses of H.T.S. prescribed for diagnosis, involving as it does prophylaxis, nor have I so far known these doses to fail to make a diagnosis of active tuberculosis. All cases that react have for practical purposes tuberculosis, fall of temperature or relief of symptoms being as significant as a rise or increase of symptoms.

It is clear, too, that a sufficient amount of antibodies—adapters and antitoxin—to the invading microbes must be attained by gradually increasing the dose of both tuberculin and catarrh antigens to a dose sufficiently high. This will be easier of attainment in most cases if reactions are controlled by giving toxin-inactivating drugs such as iodine in suitable form.

The doses must not be given at fixed intervals unless reactions permit. A good rule in chronic cases is one I follow myself—if there is no reaction after a dose, the next may be given after two clear days' interval. If there is a reaction after two clear days' all signs of it have disappeared, the giving of a dose before the reaction has disappeared—*i.e.*, during a negative phase—will make the patient worse instead of better. Finally, it is hard to understand why the simple logical proceeding of preventive inoculation is not widely adopted. Let me repeat the argument: For all practical purposes we may assume that every one reaching adult years is infected by the tubercle bacillus. Only a minority develop the disease, because the resistance of the majority is normal. If the resistance of those who develop it had been normal they would not have done so. Resistance can be made normal by inoculation with a tuberculous antigen. A potent antigen is now available at a reasonable cost, and will undoubtedly stamp out the disease if used prophylactically.[1]

I show charts of two acute cases at present under treatment. Case No. 1 had consolidation of the whole lower lobe of her left lung, with no complicating catarrh infection.

Case No. 2 was complicated with catarrh, and was very weak and ill. The response to the very small doses of H.T.S. in this case is, I think, very remarkable. Their clinical improvement has kept pace with their fall of temperature and pulse-rate.

[1] Full particulars regarding H.T.S. can be obtained on application to Messrs. C. J. Hewlett and Son, 35-42, Charlotte Street, and 83-85, Curtain Road, E.C. 2.

SURVIVAL FACTORS IN TUBERCULOSIS.

By DONALD P. SUTHERLAND,

M.B., B.S.

Senior Tuberculosis Medical Officer for Manchester.

THE following is a short summary of some preliminary observations upon survival factors resulting from an analysis of a number of cases examined in the city of Manchester. I am dealing with a class of case where we have evidence of resistance to a definite tuberculous infection, acute and active in character, and the endeavour is to ascertain if there are any common factors that will enable us to draw conclusions that may be of general value.

Year by year we find that a certain number of cases, presenting for a longer or shorter period symptoms of active pulmonary tuberculosis, become quiescent or arrested. By this one means not only that the symptoms of toxæmia subside, but that the signs of active disease in the lungs disappear, and are not to be found upon careful physical examination, and also that tubercle bacilli cannot be found in the sputum, while the working capacity is restored to a material degree. These cases do not necessarily proceed to permanent arrest or what is popularly spoken of as a cure, but in all of them survival has been recorded for a period of four years and upwards subsequent to the arrest, which has taken place in the years 1912-1917. The condition was taken so that survival periods vary from nine to four years, and, as a matter of fact, all of them are alive to-day, I believe. In all these cases tubercle bacilli have been found in the sputum, and I have thought it desirable, in the first instance, to limit my enquiry to this class of case. The number under these various restricting circumstances is not large, but with a total of forty-nine cases it appeared worth while to carry out the personal analysis required, and further, by this preliminary investigation, guidance might be obtained for the further analyses.

To establish some of the facts, it was necessary to make an analysis of some hundreds of consecutive tuberculous cases, all sputum positive, in order to have a basis of comparison. These "control" cases are taken simply as they come in the records. Departures from the control cases may help to throw some light upon the circumstances with which successful resistance to tuberculosis is associated, a line of enquiry that still requires a great deal of research.

Association with Family Tuberculosis.—In 36 per cent. of the males and 30 per cent. of the females a family history of tuberculosis existed.

Fifty consecutive male positive cases taken at random from our records showed 22 per cent. of tuberculous members, whilst the same procedure in regard to females revealed a percentage of 30. Amongst the men parental tuberculosis was responsible for half of the cases which were found to occur in the families concerned. Out of all the cases notified (1,360), pulmonary and surgical T.B. + and T.B. o—male and female—in six months (1922), we find that 18 per cent. have a previous record of family tuberculosis, in some cases going back ten or more years. If we take pulmonary cases only (1,000) for the same period, male and female, T.B. + and T.B. o, the record of family tubercle is 23·8 per cent.

Income Level of Family.—Family circumstances were financially adequate in the great majority of all cases. The association of poverty with a high tuberculous death-rate does not require elaboration here.

Nature of Work.—After the income earning age the consideration of the work in which the patient engaged seems to call for investigation, and a somewhat difficult question of selection arises. Some kind of limit has to be set to an enquiry of this kind, and somewhat wide groupings are necessary. Accordingly the division was made into indoor and outdoor work, whether it was active and laborious or sedentary, its fulfiment in a dusty or clean atmosphere, and its crowded or relatively uncrowded nature in regard to other persons. Furthermore, it appeared desirable to establish these circumstances both before and after arrest of the disease. It was found that thirty-four of the male patients engaged in indoor occupations before arrest and twenty-eight after arrest, leaving five and eleven respectively in outdoor work. The nature of the occupation was active in eighteen instances, and sedentary in twenty-one before arrest, but changed to twenty-six and thirteen after arrest, a natural and advantageous condition probably. Dusty conditions obtained in twenty-nine cases prior to the disease becoming quiescent, and this was reduced to twenty-five cases after quiescence, again an advantage for the patient. As might be expected from the figures, the crowded and uncrowded conditions of work altered, also favourably, for we find that before arrest twenty-eight were working in crowded shops and factories, and only eleven in uncrowded surroundings, whereas after arrest the figures became twenty-three crowded and sixteen uncrowded. It will be seen that in spite of the improvement in conditions obtained by patients after their treatment, nevertheless the largest proportion of them began and ended in dusty, crowded, indoor occupations, so that the importance of these factors in affecting resistance should not be exaggerated. In respect of the work carried out by female patients, ten engaged in indoor occupation before arrest and nine afterwards. This work was sedentary—crowded and dusty in nine of the ten cases before arrest—and was

active afterwards in five cases, crowded only in four and dusty in five. A material improvement is seen here in the work taken up after arrest, and also an indication obtains of the general improvement in health. The change in type of work is a much more marked feature amongst the women than it was amongst men. This may be accounted for by economic factors, the better paid occupations to which men go (having naturally more responsibilities and a greater urge to make adequate provision for dependents) are in many instances hygienically bad. There is less necessity, in the case of the majority of women, for them to sacrifice their health in this way, and we may therefore assume that an explanation based upon this supposition has some value. Another explanation is that in the cause of health women as a class are more willing to follow medical advice than are men.

District Death-Rates.—The death-rates of the districts from which these survivors came were worse than normal in the case of women and slightly better in the case of men. The early health of these cases was in general good.

Early Symptoms.—The most constant primary symptom was cough in the case of men, followed by weakness and wasting. This sequence was reversed in women. Hæmorrhage had a high rate of 46 per cent. in men as an initial symptom; it occurred much more rarely with women. Pleurisy was rare, bearing out one's clinical experience of this condition as apt to be a serious one.

Part of Lung involved.—The distribution of the lesions is of great interest. In thirty-eight male cases one or both upper lobes were involved, but whereas we find that in twenty-five the only lesion was in the right upper lobe, an infection limited to the left upper lobe alone occurred in no single instance. The only example I had of a left-sided lesion was one case affecting both upper and lower lobes in which, as a matter of fact, arrest was secured by pneumothorax, artificially produced. Amongst the thirty-eight cases of double apical infection, this was associated in two instances with a lesion in the right lower lobe. The remaining case had a lesion in the left lower lobe alone. Bearing in mind that we are considering solely the factors existing in cases who proceed to arrested disease, and with these somewhat striking facts in regard to apical and especially right apex infections, the association between resistance and site of infection appears to be put beyond reasonable doubt. Further, it would seem to be advisable in the light of this experience to consider whether the so-called physiological loss of resonance and increased expiratory murmur, which we were told might be of frequent occurrence when examination of the right apex of a normal lung was being conducted, should not rather be regarded as pathological. It is perfectly evident that it must be the sole remaining sign of an old healed lesion in very many cases where no reason to

suspect active tuberculosis of the lungs has arisen. A similar record to that of the men is found in regard to the site of the lesion in women. In all ten one or both upper lobes were involved, and in six of them it was in the right and in one only on the left—three being, therefore, bilateral. There was only one instance of a left lower lobe infection associated with the apical lesion, and no case of right or both lower lobes occurred. Strong support is given by these figures to the contention held in regard to the so-called physiological signs at the right apex, when discussing the localization of lesions amongst the male cases.

Period of Treatment.—Two-thirds of the men had two years' treatment before arrest, and others had three, four, and five years or more. The women had longer treatment before arrest, three-fifths of them requiring five years or more. The main part of the treatment was of necessity carried out at home, though practically all had received sanatorium treatment. The difference between the men and women in regard to the length of treatment may own various causes. We may be dealing with a more virulent infection or a lessened resisting power. The proportion of arrest cases to total cases has been seen to be 46 per cent. higher in the case of men than in the case of women where T.B. is positive. If we take all cases T.B. positive and T.B. negative in the same years the preponderance, however, is the other way, and we get a relatively higher proportion of cases living with arrested lesions in women. The discrepancy does not amount to so much as in the men, being about 10 per cent., but it is a big reversal. With a more virulent infection then it would appear that the arrest possibilities are better in the case of men than they are with women; whilst, on the other hand, the less advanced cases have a greater possibility of arrest in the case of women. Diagnostic errors cannot, of course, be excluded from the T.B. 0 cases, but they may be assumed to be approximately equal for the two sexes, with possibly a slight bias in favour of more errors in women than men.

Reaction to Treatment.—The results of the first six months' treatment gave some indication of value as to the ultimate prognosis. The great majority showed improvement in this period, and this was associated with a gain in weight of an average amount of 10·3 pounds in men and 8·5 pounds in women. Amongst 150 deaths in patients who survived on the average about two years after notification, their gain in weight during the first six months' treatment was approximately 3 pounds in the case of men and slightly over 3 pounds in the case of women. This is a striking difference. Any appreciably shorter period than six months is not of real value for estimating the probable prognosis, and the immediate reaction to treatment bears no constant relationship to ultimate fate.

Apart from the notes appearing in relation to each of these

groupings, other questions emerge from an analysis of this kind. The figures being small, too much stress cannot be laid upon differences of percentage ratios, and a subsequent analysis of a greater number of these cases which is in process may alter some of the views which have been tentatively suggested. There seems to be a higher incidence of family tuberculosis amongst the men than the women, and this may possibly have some bearing upon the higher arrest figures for men. It may be that immunization proceeded further in these cases, especially when we remember that the general rate of family tuberculosis was exceeded in these male cases. If so its influence would probably only be exercised after childhood, as the earlier infection is apt to be massive and fatal. I do not feel that too much stress can safely be put upon this particular factor, however.

Younger fatherhood was a marked feature of the male group of cases, and it is possible that a more vigorous and resistant offspring was the result. That general resistance is associated with specific resistance to tuberculosis is not, however, to be necessarily assumed, though it is probable that it obtains in the majority of instances.

The fact that tuberculosis cases very frequently give a history of ill-health over a longer or shorter period prior to any specific illness is of common knowledge; on the face of it such a history would lead to a conclusion that general resistance was low and therefore that infection took place readily with tubercle. But with our knowledge of the long latency of tuberculosis, its diverse manifestations, its prolonged course, and our ignorance of the factors which tilt the balance against successful resistance, we cannot ignore the possibility that these anomalous symptoms may be, in fact, amongst the earliest manifestations of active tuberculosis resisted badly.

Length of history of illness, as we have seen, was more often than not less than twelve months' duration prior to notification, but nothing of much value emerges from this as a survival factor.

But it may perhaps be justly assumed that notification occurred because these symptoms were progressive and either caused the patient to consult a doctor, or if already under treatment directed the practitioner's attention more particularly to the nature of the disease. Even in progressive, active, open cases, then one need not always despair of arrest of the lesion, though notification be not made for one reason or another at the earliest possible moment, desirable in the highest degree though this may be.

The prevalence of hæmoptysis in male cases and its absence in women has been noted. As an evidence of the severity of a lesion it is generally worthless. The absence of pleurisy is to my mind remarkable, but I have long had the gravest doubts as to the prognosis wherever pleuritic symptoms in an open case are prominent. This

somewhat negative evidence of the figures is in strong support of one's observations. Sufficient has been said in regard to the distribution of the disease to make it certain that prognosis is better with an apical than any other lesion, and that this becomes very considerably improved when the right apex alone presents the classical signs of active disease. Length of treatment has been sufficiently dealt with.

The sanatorium treatment which was given in almost all cases may or may not have influenced the result. All that can be said is that the opportunity afforded for satisfactory treatment and observation together with educative facilities was taken advantage of by all of them. That the ultimate prognosis depends upon length of time in institution does not appear to be proved, but that useful lengthening of life can be secured by such means is undoubted. The greatest good to the greatest number, patients and public alike, will be accomplished in an over-infected population like that of Manchester, with intelligently used and modified institutional care. If under treatment (generally institutional) improvement is noted after the first six months, the outlook under ordinary conditions should be regarded as at least hopeful in the cases falling within the requirements already set out. It may be noted that less marked improvement was recorded in this period in the female cases than in the male—again supporting the contention in regard to the greater chance of arrest in the open cases amongst the latter.

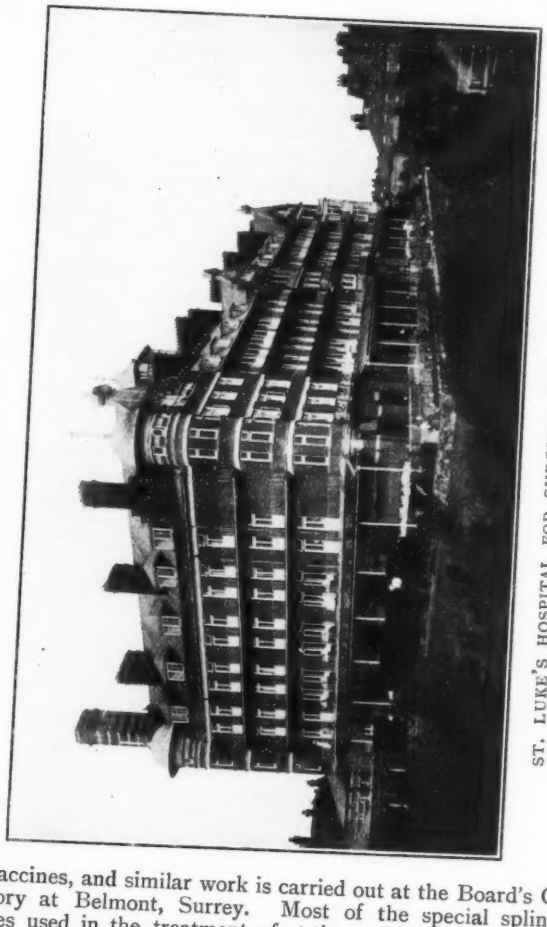
ASSOCIATIONS AND INSTITUTIONS.

ST. LUKE'S HOSPITAL FOR SURGICAL TUBERCULOSIS, LOWESTOFT, SUFFOLK.

We are indebted to Mr. W. M. Oakden, B.A., M.B., B.Ch., F.R.C.S., Medical Superintendent of the above hospital, for the following account:

It is the statutory duty of County Councils to make adequate arrangements for the treatment of tuberculosis in their respective areas. In the performance of this duty the London County Council, not having institutions of its own suitable for the residential treatment of such cases, has taken advantage of the accommodation provided by the Metropolitan Asylums Board, along with other hospital and sanatorium authorities. In this way the Board has come to place at the Council's disposal an increasing number of beds in its various institutions for all types of tuberculous patients, and in order to meet the pressing need for hospital accommodation for adult cases of surgical tuberculosis, it became expedient to open a separate institution specially adapted for these cases. Accordingly, the Metropolitan Asylums Board, having ascertained the adaptability of the building for use as a hospital and the suitability of the climate for the treatment of the proposed cases, purchased in 1921 a large building, formerly the Empire Hotel, situated on the sea-front at Lowestoft. After the necessary internal reconstruction had been carried out, the building was equipped and opened in May, 1922, as St. Luke's Hospital. Only patients undergoing treatment under the London County Council's Tuberculosis Scheme are normally eligible for admission, and they are received on the recommendation of tuberculosis officers, of the medical staff of a general or special hospital, or of the Medical Officer of Health to the Council. Among the male patients are included a certain number of war pensioners undergoing treatment for tuberculosis contracted during, or as a result of, their war service. The hospital building, which stands in its own grounds facing the sea, consists of six floors connected by hydraulic lifts. It is heated throughout by a central steam installation, and has its own electric service for light and power. The wards, situated on the ground, first, and second floors, vary in size from three to twenty-five beds. The majority open on to verandahs or balconies by means of French windows, whereby the full benefit of the sun and sea air is readily obtained. Fanlights above these windows allow of adequate ventilation should inclement weather compel the closure of the larger casements. On the ground floor are also situated the recreation and mess rooms for the ambulant patients. There is accommodation for 164 male and female cases over the age of sixteen years, and of these usually some two-thirds are confined to bed. A small but fully equipped operating theatre, with

separate anæsthetic and sterilizing rooms, enables any operative treatment to be carried out, while a complete modern X-ray installation with a Coolidge tube is available for diagnostic purposes. A small laboratory has been equipped for microscopic examinations. The investigation of pathological fluids by animal inoculation, the prepara-



ST. LUKE'S HOSPITAL FOR SURGICAL TUBERCULOSIS, LOWESTOFT.

tion of vaccines, and similar work is carried out at the Board's Central Laboratory at Belmont, Surrey. Most of the special splints and appliances used in the treatment of patients are made in the splint workshop specially equipped for the purpose. Spinal frames are made on the lines described by Dr. W. T. Gordon Pugh.[1] These frames are adaptable to cases of sacro-iliac or hip-joint disease in addition, and enable a maximum degree of immobilization to be obtained, while at the same time facilitating nursing. By means of wheeled carriages, to

[1] See *Lancet*, 1921, i., 1071.

which the frames are fixed, heavy adult cases can be readily moved into the open air single-handed. Duralumin, which is light yet strong, is largely employed in the construction of spinal braces and splints for the leg and arm joints. As far as possible leather is eliminated on account of the soiling and deterioration that results from the absorption of body exudates. Plaster of Paris is also used for splinting in the subacute stage when the risk of abscess formation has subsided. In the early stages of spinal and joint tuberculosis thorough immobilization, with relief of weight-bearing, is of prime importance, and to attain this in the highest degree recumbency is an important factor, which is too frequently deferred until complications have made it an essential part of the treatment. But confinement to bed does not dispense with the need for supplementary aids to fixation if the short cut to a successful issue is to be assured. Nor need recumbent treatment under suitable conditions be associated with the deterioration of the appetite and of the general condition that is given as the time-honoured reason for the adoption of ambulatory methods. As a means of relieving the general hospitals in the large centres of population of the pressure on their all too limited number of beds by such cases, the value of country and seaside institutions for surgical tuberculosis is being increasingly appreciated. Nevertheless, as with pulmonary tuberculosis, so with spinal and joint disease, there appears to be a very real difficulty in submitting the early cases to residential treatment. A few months of such treatment in the early stage, before abscesses, sinuses, and paraplegia have developed, would frequently obviate the need for years of enforced hospital and infirmary treatment during repeated relapses or the terminal stages of the disease. In general, conservative measures on these lines are adopted at St. Luke's Hospital. Abscesses are aspirated and, as a rule, rapidly sudside if immobilization is adequate. Sinuses are treated by heliotherapy, radiant heat, the injection of antiseptic paste, the removal of sequestra, or by excision of the sinus track. Owing to the age of the patients, excision of the joints is not attended with defective growth often observed under similar conditions in children, and it is therefore practised where the joint is extensively disorganized or the seat of sinuses, and a more rapid recovery can be confidently expected. Spinal fixation by means of a bone graft or Hibb's operation has not replaced the routine method of immobilization on a spinal frame, as experience has failed to show that the necessary period of recumbency will be very materially curtailed by a somewhat serious operation. There would appear to be a very definite risk of abscess formation occurring some months after an apparently successful grafting operation has been performed, and this may be attributable to the prevention by the graft of the slight longitudinal collapse of the vertebral bodies that occurs in the majority of the healed cases of strictly localized disease. As adjuvants to the treatment outlined above, tuberculin, cod-liver oil derivatives, and collosal preparations are employed. To these must be added exposure to sunlight when suitable conditions prevail, and a liberal diet aided by the stimulating effect of an East Coast climate. The drinking of large quantities of milk in its natural form is not advocated as a routine, on account of its liability to affect the digestion of, and impair the appetite for, the more concentrated and nutritious solid food. It is considered that much of the gastric and intestinal

disturbance that is commonly attributed to tuberculosis itself is in actual fact directly due to the introduction into the diet of large quantities of milk, eggs, and other so-called "easily digestible" articles of diet. In addition to bone cases, a certain proportion of gland, peritoneal, genito-urinary, and skin cases are admitted. In view of the frequent need of dental treatment in all cases, and particularly in those of cervical adenitis, a dental department has been established under the care of a visiting surgeon. There is no fixed limit to the duration of stay of an individual patient, and each case is dealt with on its merits. Continuity of treatment from the acute stage to convalescence is therefore possible, and the liability for complications or relapses to supervene is diminished. So that discharged patients may have repairs or alterations to their appliances carried out without difficulty, the Board, with the concurrence of the London County Council, is taking steps to establish in London in the near future an after-care clinic, to which it will be possible to refer patients.

The Tuberculosis Society will hold a provincial meeting at Cambridge, April 10, 11, and 12, in the Pathological Lecture Theatre. The following papers will be read: "A Comparison of Tuberculosis in Man and Animals," by Dr. Louis Cobbett; "Experiences with Diaplyte Vaccines," by Dr. E. Ward; "Tuberculosis Work in America," by Dr. R. C. Matson, of the National Tuberculosis Association of America; "Lupus," by Dr. Stanley Griffith; "The Present-Day Treatment of Bone and Joint Tuberculosis," by Mr. G. R. Girdlestone. On Saturday, April 12, a visit will be paid to the Papworth Colony, by kind invitation of the Medical Director, Dr. Varrier-Jones. Arrangements have been made for the issue of cheap railway tickets, and a limited number of rooms will be available in Clare College at an inclusive charge of 20s. per day. Those wishing to avail themselves of these facilities should communicate with the Hon. Secretary at once—Dr. F. J. C. Blackmore, 138, Herbert Road, Plumstead, S.E. 18.

NOTICES OF BOOKS.

A TREATISE ON TUBERCULOSIS.

THE work on tuberculosis which is being issued under the general editorship of Professor Loewenstein is a notable one, deserving the study of all serious students of tuberculosis.[1] A review of the first volume appeared in this journal for July, 1923, where we stated that a very high opinion had been formed of the work, and that we could earnestly recommend it as a valuable guide in the treatment of tuberculosis in its various aspects. A perusal of the second volume now before us confirms and fortifies that opinion. At the same time, some of the exceptions we took with respect to certain articles in the first volume equally apply to that under consideration. Vol. II. consists of some 1,000 pages, and is divided into twenty-three chapters as follows: Chapter I., on the specific treatment of tuberculosis, is contributed by the editor; Chapter II., on kidney and bladder tuberculosis, is by the late Professor Zuuckerkandl; Chapter III. is by Dr. Robert Lichtenstein on the prostate and testicles. The next chapter is on cutaneous tuberculosis by Dr. Richard Volk. Tuberculosis of the eye is dealt with by Dr. Arnold Löwenstein; the treatment of cardio-vascular tuberculosis is discussed by Professor N. Jagie; the pathology and treatment of the female genital organs are described by Dr. Josef Novak; the upper respiratory passages are dealt with by Professor Emil Glas; the X-ray treatment of pulmonary and laryngeal tuberculosis is provided by Professor Dr. Otto Ziegler; whilst the chapter on tuberculous pleurisy and empyema is from the pen of Professor A. Bacmeister. The next four chapters deal with the methods and results of surgical treatment of pulmonary tuberculosis, and have been respectively contributed by Professor F. Jessen, Chr. Saugmann, Josef Sorgo, and Umberto Carpi. The relationship between the endocrine glands and tuberculosis is considered by Professor J. Wiesel and Dr. R. Löwy. Gastro-intestinal tuberculosis is described by Professor O. Porges, and aural tuberculosis by Dr. G. Bondy. The treatment of bone and joint tuberculosis is discussed by Dr. J. Hass. The three chapters on sputum disinfection, chemotherapy, and domestic treatment of tuberculosis are from the pen of Professor E. Loewenstein; whilst the final chapter is by Dr. Heinemann, and relates to tuberculosis in the tropics. This enumeration will convey a good general idea of the scope of the work. We can confidently state that as a reference book on the treatment of tuberculosis it will be found not only invaluable, but indispensable. As far as we could test it, the work affords an exhaustive account of the various methods of treatment of tuberculosis in different

[1] "Handbuch der gesamten Tuberkulose-Therapie," herausgegeben von Prof. Dr. Med. Ernst Loewenstein (Wien). Band II., mit 190 teils farbigen Textabbildungen, 3 farbigen und 2 schwarzen Tafeln. Berlin and Wien: Urban and Schwarzenberg. 1923.

parts of the body. Indeed, we believe that its very exhaustiveness constitutes the only real fault we can find with the book. The details are in some cases too bewildering to anyone who does not specialize in tuberculosis. For example, three chapters, aggregating 225 pages, are devoted to the subject of artificial pneumothorax, and of these, no less than 128 are taken up with a description of the technique of the method. We are also of opinion that some chapters or portions of chapters are out of place in a work devoted to treatment. Thus the chapter on endocrine glands (32 pages) seems irrelevant, the pathology of tuberculosis of the female genital organs could have been omitted, and the statistical matter on tuberculosis morbidity and mortality in the tropics can be of interest only in a general work on tuberculosis. Lastly, we think that a book, each volume of which measures unbound, 10½ by 7½ by 2 inches, and weighs 7½ pounds cannot be properly called a *Handbuch*.

W. M. FELDMAN, M.D. (LOND.), F.R.S. (EDIN.).

THE PHYSIOLOGY AND THERAPEUTICS OF ALPINE CLIMATES.

Dr. Amrein, of Arosa, has written a short but excellent account of the chief features of and principal indications for treatment in Alpine climates.[1] The meteorology of such climates is fully described, with much statistical information. The value of dryness of mountain air as a healing factor is specially insisted upon. In a chapter dealing with the physiology of high altitude, there is to be found a useful and very complete discussion whether the enhanced richness of the blood is apparent or real; the evidence for these conflicting views is well expressed, and serviceable descriptions are provided of the many methods whereby the problem has been attacked; the balance of witness apparently favours the theory that there occurs an actual increase of corpuscles and hæmoglobin. The absence from this chapter of reference to the work of Leonard Hill and his school of British investigators on human metabolism at high altitude, will, it may be hoped, be corrected in the next edition. Indications and contraindications for treatment in the mountains are wisely presented and support the author's generalization that the only outstanding contraindication is a lack of recuperative power; any condition which vetoes the establishment of maintenance of the compensatory mechanisms of respiration, circulation, and excretion will necessarily prevent the reaping of benefit by the patient. The booklet is a useful exposé of our present knowledge regarding Alpine climatology and therapeutics.

ROBERT G. BANNERMAN, M.D.

EARLY PULMONARY TUBERCULOSIS.

Neumann has produced the first part of a work dealing with the clinic for early tuberculosis in the adult.[2] The section before us

[1] "Pulmonary Tuberculosis: What Patients suffering from Tuberculosis should know, with Special Reference to High Altitude Treatment, including other Treatment and 'Curing.'" By O. Amrein, M.D., Medical Superintendent of the Sanatorium, Altem, Arosa, Switzerland. Pp. 32. Arosa: F. Junginger-Hefti. 1923.

[2] "Die Klinik der beginnenden Tuberkulose Erwachsener. I. Der Gang der Untersuchung." By Wilhelm Neumann. Privatdozent. University of Vienna. Pp. 158. Vienna: Rikola Verlag, Radenplatz 5. 1923. Price not stated.

concerns the methods of examination, and will be found to have much value as a guide to early diagnosis: and few subjects can claim a greater importance. To such an extent is the prognosis and successful handling of a case of pulmonary tuberculosis dependent upon its early recognition that no sign is too trivial for consideration if it can but add something of value to the evidence of the disease. Neumann justifies the intensive study of diagnosis by recollecting how at one time anæmia was a rather vague term now known to include—and, he might have added, to have hidden—a number of diseases; the present-day shibboleth "neurasthenia" is in turn not infrequently an admission of inefficient investigation. Stress is laid on the importance of accurate and intelligent case-taking, but to most physicians so elaborate an anamnesis as Neumann wishes us to adopt may appear too time-absorbing. Much more interest attaches to the section in which the author discusses physical inspection, for it is a storehouse of facts dealing with those minor physical peculiarities which, while individually equivocal, nevertheless in the aggregate may set the examiner on the right path. Such, for example, is acne, especially of the face and back, so often an accompaniment of an abortive type of tuberculous disease. Anomalies of distribution and colouring of the hair are described; a bad prognosis is associated with the occurrence of normally coloured hair on the head, while the hair on the face, axillæ, and pubes is red; or, in the female, a type of distribution of hair similar to that on the male pubes. Many other data go to make this chapter one of the most interesting and important in the book. The diagnostic importance of Pottenger's "slight touch palpation" in early pulmonary tuberculosis is discussed, together with the various points of tenderness which are too often neglected. There is a masterly handling of that obscure subject, the physics of auscultation; for example, it is pointed out that bronchial breathing, so classical a sign of a pneumonic condition of the lung, may yet be absent in that condition if the vocal cords are not in action, whether by reason of atony, paralysis, or tracheotomy. Many problems of percussion are also fully discussed and illustrated. Neumann's volume is to be recommended not merely as a trustworthy guide to the examination of suspected cases of pulmonary tuberculosis, but also as a scientific treatise, containing much that is original and serviceable regarding physical signs.

ROBERT G. BANNERMAN, M.D.

HIGH BLOOD-PRESSURE.

Dr. Halls Dally's new handbook[1] contains much technical information regarding high blood-pressure and its variations and control. Nor is the volume wanting in information on how to carry out observations on both the systolic and diastolic blood-pressure. In the short section devoted to the discussion of the arterial pressure in pulmonary tuberculosis the author has contrived to say, in limited compass, all that is known with regard to the effect of the disease upon the blood-pressure. We only wish that there was as much practical value in making

[1] "High Blood-Pressure: Its Variations and Control." A Manual for Practitioners, by J. F. Halls Dally, M.A., M.D., B.C. (Cantab.), M.R.C.P. (Lond.) Pp. xii+155. London: William Heinemann (Medical Books), Ltd. 1923. Price 10s. 6d.

sphygmomanometric observation in pulmonary tuberculosis as his quotation at the head of the Section X. of Dr. Gallavardin's dictum would lead us to suppose actually existed—namely, that what the thermometer is in acute diseases, the sphygmomanometer is in chronic disorders. Dr. Halls Dally is, however, perfectly right in pointing out that the toxæmia which develops in the later stages of consumption has the same effect as that produced by all pathogenic organisms, namely a lowering of blood-pressure, and he is on sure ground in insisting that this baneful effect varies directly with the severity of the toxæmia, and not necessarily with the extent of the lung substance involved. The outlook is indeed grave in pulmonary tuberculosis when the blood-pressure falls continuously. We are not quite sure that our own experience agrees with the statement that the evolution of a case of pulmonary tuberculosis in a favourable direction is the rule in raised pressures, for we have repeatedly seen, when pulmonary tuberculosis occurs in cases of Hyperpiesia, unfavourable results when the toxæmia of the former disease is severe enough to, as it were, use up the blood-pressure which is above normal limits, and ultimately leads to dangerous hypopiesis. The only way in which Hyperpiesia produces a favourable evolution in pulmonary tuberculosis is by making fatal hypopiesis more remote, just as a rich man is generally further from bankruptcy than a man less well to do. Hyperpiesia is not a sort of antidote to the toxæmia of consumption. Dr. Halls Dally throughout his book shows such insight into the problems connected with this subject that we should like to know whether he has personally verified the observation that the maximum pressure was higher, as a rule, on the affected side than on the other in cases of acute spread of the disease, or hæmoptysis in unilateral consumption with the advent of a widespread use of artificial pneumothorax in cases of hæmoptysis, in whom the ordinary localizing signs may be absent, the verification of such a statement is almost a duty (an equal, if not a greater, duty would be to explain such a phenomenon).

H. Batty Shaw, M.D.

THE EXAMINATION OF TUBERCULOUS SPUTUM.

Dr. Sedlmeyr's practical manual, recently issued and dealing with the examination of tuberculous sputum, is a work which has much to recommend it,[1] for, as far as we know, no more extended description of the subject has appeared, and the physician who systematically follows out the programme laid down therein will not fail to derive the utmost information a specimen can yield. When the examiner reaches the stage of selecting a method of staining a film for the tubercle bacillus, his difficulty will consist in discriminating among the almost innumerable variations of the Ziehl-Neelsen technique; but the description of these is followed by an excellent critique, in which Sedlmeyr reaches the conclusion that, after the ordinary carbol-fuchsin-acid-methylene-blue method, all the tubercle bacilli in the preparation are not brought to view; but he states that this method, which has so well stood the test of time, can be retained with an enhanced value if, instead of using

[1] "Untersuchung des tuberkulösen Sputums." By Peter Sedlmeyr, Assistenzarzt an der Lungenheilstätte Uberruh. Pp. 68, with two coloured plates. Leipzig: Johann Ambrosius Barth. 1923. Price not stated.

methylene-blue as a counterstain, some yellow stain be employed such as picric acid, chrysoidin, or tincture of iodine. Of the many other modifications, the author finds that Hermann's is of most value. The following mixture is made just prior to use:

> Three per cent. alcoholic crystal violet, 1 part; 1 per cent. aqueous ammon. carbonate, 3 parts. The mixture is placed on the dried film of sputum and heated to steaming point, after which the stain is allowed to act for one minute before being decolorized by 10 per cent. nitric acid for a few seconds and 96 per cent. alcohol until the preparation is pale blue. After washing in water it is counter-stained with bismarck brown, safranin, or 1 per cent. aqueous eosin.

The dark-ground method is described, but it is considered that a further experience is required before its advantages can be admitted. A large number of concentration methods are described, and although the advantage of some such procedure is in some cases self-evident, and may save some time, Sedlmeyr is no great enthusiast in the matter. The significance of Much's granules as representing a biochemical modification of the ordinary form of bacillus is fully recognized. The whole monograph, and in particular the long bacteriological section, is to be recommended to the laboratory worker who wishes something more discursive than is to be found either in the customary manual of bacteriology or the special text-books on pulmonary tuberculosis. The volume is completed by a few coloured plates and a lengthy bibliography.

ROBERT G. BANNERMAN, M.D.

THE COMPARATIVE ROENTGENOLOGY AND MORBID ANATOMY OF PULMONARY PHTHISIS.

Drs. Gräff and Küpferle have recently issued two volumes which represent a large amount of first-class work, and form a very notable contribution on the one hand to the pathological anatomy of pulmonary tuberculosis, and on the other hand to the interpretation of radiograms.[1] The authors have chosen fifty-two out of a hundred and ten cases, and the work consists in the main of an intensive study of these cases from the clinical, pathological, and radiographical aspects. Some preliminary chapters discuss the pathology of phthisis and the radiography of the normal chest. Stress is laid on the fact that one of the chief elements in the throwing of a shadow is the blood, for it can be shown experimentally that a lung subjected to congestion becomes more obstructive to the rays. Certain possible fallacies in the method of investigation are recognized; for example, the X-ray photographs were, of course, made some time before death—a photograph made thereafter is less valuable owing to post-mortem changes—so that the pathological picture was liable to differ from that which the radiogram suggested, perhaps from the supervention towards death of hypostatic pneumonia or pleural effusion. Again, the radiogram is made with the chest in the position of full inspiration as against the expiratory position at autopsy. But these details, once recognized, do not detract from the value of the method. Another source of apparent lack of parallelism

[1] "Die Lungenphthisie: Ergebnisse vergleichender Röntgenologisch-Anatomischer Untersuchungen." By Siegfried Gräff and Leopold Küpferle. Vol. i., pp. 237, text; vol. ii., 221 illustrations, photographic and stereoscopic plates and radiograms. Berlin W. 9: Julius Springer, Linkstrasse, 23-24. 1923. Price £2 6s. 8d.

might arise from the fact that the X-ray picture shows on the flat shadows derived from lesions at various planes of the chest; it was therefore necessary to make serial sections from front to back of the chest in order to get at a true comparison with the radiogram. The cases are so chosen as to be representative of all types of the disease in so far as it comes to the post-mortem room, and their analysis and illustration will be of the greatest value to the clinician who has radiograms to interpret. The relegation of the illustrations to a separate volume makes their study alongside the text a matter of great convenience, and it is hardly possible to praise them sufficiently; they consist of photographs, some of them stereoscopic, and radiograms beautifully reproduced on fine paper. The whole is an excellent example of co-ordinated study, and from the publisher's point of view a remarkable production from a country in Germany's economic state.

ROBERT G. BANNERMAN, M.D.

PULMONARY TUBERCULOSIS.

Pulmonary tuberculosis is still the most prevalent, distressing, and perplexing of all forms of tuberculous disease. It possesses an enormous literature. Many and oftentimes complicated methods of the investigation of cases of tuberculosis of the lungs have been elaborated, and drugs, dietetic, hygienic, climatic, and other measures which have been introduced to secure its amelioration or arrest are multitudinous. Dr. Guy, of Edinburgh, with no little courage, but with sound judgment based on long and intimate experience with tuberculous cases and all medico-sociological aspects of the tuberculosis problem, has prepared and issued a compact, comprehensive, and fairly complete exposition regarding all essential points ralating to the recognition and management of consumptive patients.[1] The author has evidently experienced considerable difficulty in selecting his material and in keeping all in right perspective, for the work is primarily intended for the medical student and practitioner, although there is much that will be of interest to tuberculosis officers and all other specialists dealing with tuberculous cases. Let it be said at once that Dr. Guy has succeeded in his aims, and has produced a handbook which, taken all in all, is probably the most lucid, up-to-date, and generally serviceable of all the numerous manuals which in recent years have been written on pulmonary tuberculosis. After initial discussions regarding epidemiology, infection, pathology, predisposition, and symptomatology, detailed attention is directed to the various methods for the physical examination of the chest, which, as the author rightly declares, is "the weak point of the student." There are also special chapters on X-ray examination, tuberculosis in children, classification, and differential diagnosis. The sections dealing with treatment are particularly helpful. There is a judicious consideration of artificial pneumothorax. The work concludes with studies regarding prophylaxis

[1] "Pulmonary Tuberculosis: Its Diagnosis and Treatment." A Handbook for Students and General Practitioners. By John Guy, M.D., D.P.H., F.R.F.P. and S., F.R.C.P.E.; Deputy Medical Officer of Health and Tuberculosis Officer for the City of Edinburgh; Lecturer on Tuberculosis, School of Medicine of the Royal College, Edinburgh. Pp. xii + 307, with fifty-one illustrations. Edinburgh: Oliver and Boyd, Tweeddale Court. 1923. Price 16s. net.

and tuberculosis in its public health aspect. Praise should be given to the illustrations and charts, which have all been carefully selected; each provides real instruction. Dr. Guy closes his manual on an optimistic note. "That tuberculosis will ultimately disappear from our midst the writer has little doubt, and if the fall in the death-rate continues as it has done, in another thirty years the part contributed by tuberculosis to the general death-rate will be comparatively insignificant." A final word of commendation is due to the publishers, who have issued the work in particularly effective and pleasing form, although doubtless many a student will wish the price had been lower.

THE TUBERCULIN DISPENSARY.

Dr. Camac Wilkinson in 1909 established the Tuberculin Dispensary League, and under its auspices a considerable number of tuberculous patients have been treated with tuberculin—for three years at a dispensary at Kennington and then at the existing dispensary at Chelsea. Recently the League sought the approval of the Ministry of Health regarding its dispensary work, and in due course an investigation of the activities of the dispensary was made on behalf of the Medical Research Council, with the result that a confidential report was prepared in which it was stated that Dr. Camac Wilkinson's system of "treatment did not appear to have claims over other methods of treating tuberculosis, either with or without tuberculin, which would justify its general adoption." Dr. Camac Wilkinson has furnished a spirited reply in the form of a brochure, in which he comments on the results of treatment of a number of his patients.[1] He also criticizes the comments made by the three medical men who investigated the work of his tuberculin dispensary, and prepared a "confidential" report. Dr. Wilkinson defends his views and his actions, and vigorously condemns the prevailing tuberculosis system with its dispensaries, sanatoria, and whole-time tuberculosis officers. In his concluding sentences he contends that "treatment in a sanatorium is a policy of despair," and he adds: "The cost of a patient's treatment at a sanatorium for six months averages about £100, if we include loss of wages and loss of results of labour. . . . The doctor receives about 10 per cent. of the cost, £50 goes to non-medical services, and £40 is just lost. Thus, if the Government provides £1,000,000 a year for treatment in a sanatorium the medical profession receives £100,000. The rest is spent on bricks and mortar, maintenance, and service, including the service of many non-medical officers and servants, or is thrown away. £1,000,000 spent on sanatorium treatment would at the best benefit 20,000 suffering from the disease." Whatever may be thought of the efficiency and permanent advantages, or otherwise, of Dr. Wilkinson's method of treating necessitous tuberculous cases at a tuberculin dispensary, there will probably be many who will go far with him in his belief that our existing system of dealing with poor and

[1] "The Tuberculin Dispensary for the Poor." By W. Camac Wilkinson, M.D., F.R.C.P., late Lecturer in Medicine, University of Sydney; Parkes-Weber Prizeman, 1909. With a Preface by Randall Davies, Hon. Treasurer Tuberculin Dispensary League. Pp. 67. London: Nisbet and Co., Ltd., 22, Berners Street, W. 1. 1923. Price 1s. net.

needy tuberculous subjects is unscientific, expensive, and in the majority of cases ineffective. Dr. Wilkinson's booklet is likely to arouse discussion.

MANUALS FOR MEDICAL ADVISERS AND WORKS OF REFERENCE.

Tuberculosis officers and superintendents of sanatoria are in danger of becoming merely specialists in tuberculosis, whereas, in dealing with the subjects of this disease, there is the greatest need for a wide outlook and a comprehensive knowledge regarding medical work generally. Certainly all advisers responsible for the care of tuberculous patients have need for a sound general acquaintance with dermatology. Dr. Burnett Ham has recently issued a suggestive chart and plates which tuberculosis officers will find of considerable practical value.[1] The work consists of two excellently produced coloured plates, on which lesions are illustrated and labelled by their guiding lines. The more common of the diseases of the skin are effectively portrayed in their chief characteristics, and the customary situations indicated. The author's aim has been to group together lesions by contrast and in association, so that the memory may be aided and a sure guide afforded in diagnosis. Not only are the illustrations admirably planned and effectively produced, but the accompanying descriptive matter is conveniently arranged for rapid reference, giving in concise words just the information and guidance which the busy doctor is likely to desire. The plates are loose, so that they can be studied alongside the reference in the text. Dr. Burnett Ham has produced a work which will be of real assistance to all medical practitioners.

The recently issued vol. xi. of the great system, "Nouveau Traité de Médecine," which is being issued under the direction of Professors Roger, Widal, and Teissier, is devoted to a consideration of the "Pathologie de l'Appareil Respiratoire."[2] The following are the chief sections: "Sémiologie de l'Appareil Respiratoire," by Professors Bezançon and De Jong; "Pathologie du Nez" and "Pathologie du Larynx," by H. Bourgeois; "Affections de la Trachée et des Bronches," by Professors Bezançon and De Jong; "Bronchopneumonies," by Professor Hutinel and M. Paisseau; "Les Congestions Pulmonaires," "Gangrène Pulmonaire," "Les Abcès du Poumon," "Pneumonie Disséquante," "Embolies de l'Artère Pulmonaire," "Apoplexie Pulmonaire," "Emphysème Pulmonaire," "Syphilis Pulmonaire," "Les Scléroses Pulmonaires," "Pneumokonioses," "Atélectasie Pulmonaire," all by Professor Harvier; "Cancer Pleuro-Pulmonaire," and "Kystes Hydatiques du Poumon," by Ribadeau-Dumas. We understand that in vol. xii., which will be issued shortly, "Tuberculose et Pseudo-Tuberculoses Pulmonaires" will be dealt with by Professors

[1] "A Synoptic Chart of Skin Diseases for the Use of General Practitioners and Students." By B. Burnett Ham, M.D., D.P.H. Royal folio (20 in. by 12½ in.). With two coloured Plates, illustrating upwards of 90 lesions. London: H. K. Lewis and Co., Ltd., 28, Gower Place, W.C. 1. 1924. Price 12s. 6d. net.

[2] "Nouveau Traité de Médecine." Publié sous la direction de MM. les Professeurs G. H. Roger, F. Widal, P. J. Teissier, Secrétaire de la Rédaction Marcel Garnier: Fascicule XI., "Pathologie de l'Appareil Respiratoire (Nez, Larynx, Trachée, Bronches, Poumons)." Pp. 636, avec 87 figs. dans le texte et 5 planches en couleurs. Paris: Masson et Cie, Libraires de l'Académie de Médecine, 120, Boulevard Saint Germain. 1923. Prix 45 fr. net.

Letulle and Halbron. Tuberculosis officers and all who specialize in tuberculous affections of the chest have need to study all forms of intra-thoracic disease with thoroughness. The above enumeration of subjects expounded in this handsome, well arranged, excellently printed, and effectively illustrated volume will be sufficient to indicate that the work is one which will be of exceptional interest and no little service to all chest specialists, not only in French-speaking countries, but in this country and in America. All who have participated in the production of this informing and up-to-date volume are to be congratulated. Certainly British physicians should make a note of the volumes of the "Nouveau Traité de Médecine."

Mr. Frank Coke has provided an admirable survey of present-day knowledge regarding the syndrome we speak of as asthma.[1] The author defines asthma as "a form of dyspnœa in which the obstruction to respiration lies in and about the bronchi and the bronchioles." The anatomical and physiological aspects of asthma are described, and the influence of heredity and other antecedent causes is discussed, and then follow detailed accounts of the symptoms and physical signs and descriptions of the various types. A valuable chapter is devoted to an exposition of modern views regarding sensitization to foreign proteins, and in another chapter the pathology, diagnosis, prognosis, and prophylaxis of asthma is fully considered. The work is thoroughly practical, and nearly half the book is given up to details of treatment. Every doctor who is responsible for the care of chest cases should study this comprehensive, lucidly expressed, and thoroughly serviceable treatise. The coloured frontispiece presents an excellent illustration of types of dermal reactions in asthmatic subjects.

Dr. H. Drinkwater has compiled an excellent epitome of medical progress over the past half-century (1873–1922).[2] The headings of the sections are arranged in alphabetical order. The author just claims that, "without doubt, the last fifty years must be looked upon as the golden age of medical progress, not only because of the immense number of new facts discovered, but also because of their practical application." The volume is a monument of patient, painstaking research, entailing wide reading, sound judgment, and a discrimination based on experience and scientific training. The work is one which should be in the hands of every medical practitioner. A section which, however, is all too brief, is devoted to tuberculosis, in which some of the chief historical data are presented, commencing with Cohnheim's work on infectivity in 1877. The book is effectively illustrated, and contains a number of portraits of distinguished medical workers many of whom are still living.

Mr. Henry Ford's record of his life and work is one which deserves to be read by all who are interested in the application of science to industry and the development of enterprises making for the increase of health and happiness among workers.[3] This autobiography of a notable benefactor of men, a master of constructive engineering and a genius

[1] "Asthma." By Frank Coke, F.R.C.S.. Pp. viii + 260, with frontispiece of types of dermal reaction and other illustrations. Bristol: John Wright and Sons, Ltd. 1923. Price 15s. net.

[2] "Fifty Years of Medical Progress, 1873–1922." By H. Drinkwater, M.D., M.R.C.S., F.R.S.E. Pp. x + 183, with 37 illustrations on 35 plates. London: H. K. Lewis and Co., Ltd., 28, Gower Place, W.C. 1. 1924. Price 10s. 6d. net.

[3] "My Life and Work." By Henry Ford, in collaboration with Samuel Crowther. Pp. 289. London: William Heinemann, Ltd. 1923. Price 12s. 6d. net.

for organization and administration, is not only an account of the ideas, methods, and accomplishments of a millionaire, but is a picturesque and virile record of a far-seeing, practical man who has done much for human betterment. Mr. Ford's exposition of the working of his hospital merits serious consideration. To all who are seeking to establish settlements for tuberculous and other handicapped workers we commend a study of this stimulating, outspoken, eminently practical volume.

Dr. H. A. Ellis has issued in convenient booklet form his account of work carried out in the Research Laboratory of the Margaret Street Hospital for Consumption, London, dealing with "the bio-chemical relation of the urine variations of the excretion cells in their relation to health and disease, and their consideration as a factor in creating the condition called constitution."[1]

So-called rheumatic manifestations are wont to arise among some tuberculous subjects undergoing open-air treatment. It will be well, therefore, that medical superintendents of sanatoria should study the recently issued special report on rheumatic diseases issued by the Ministry of Health.[2]

The American National Research Council, 1701, Massachusetts Avenue, Washington, W.C., have sent us review copies of the report of the Committee presided over by Dr. Ellsworth Huntington, containing a careful study of geographical variations in influenza outbreaks in the United States;[3] and also a suggestive study of tuberculosis mortality in Colorado.[4]

The National Association for the Prevention of Tuberculosis has issued a handsome volume containing the Transactions of last year's Annual Conference.[5] The communications relate to: "The Care of Advanced Cases of Tuberculosis, especially as regards Prevention of Infection"; "The Nature and Extent of Damage done by Tuberculosis derived from Infected Milk, and Methods of Prevention"; "The Prevalence of Phthisis in Different Industries and Means for its Prevention"; "Notification of Tuberculosis"; "Proposed Amendments of Procedure"; and "Care and After-care in Tuberculosis." There is also a report of a public address by Professor Sir Robert Philip, on "The Actual Position of the Tuberculosis Problem To-day." This record of authoritative opinion demands the serious consideration of all concerned in securing the prevention and arrest of tuberculosis in this country.

[1] "Reaction in Relation to Disease." By Henry A. Ellis, B.A., M.B., Ch.B. Assistant Physician Margaret Street Hospital for Consumption, Cavendish Square, London. Pp. 27. London: H. K. Lewis and Co., Ltd., 28, Gower Place, W.C. 1. 1924. Price 1s. net.

[2] Ministry of Health Reports on Public Health and Medical Subjects, No. 23, "The Incidence of Rheumatic Diseases." Pp. xi+97. London: H.M. Stationery Office. 1924. Price 2s. 6d. net.

[3] *Bulletin of the National Research Council*, vol. vi., Part 3, No. 34, July, 1923: "Causes of Geographical Variations in the Influenza Epidemic of 1918 in the Cities of the United States." Report of the Committee on the Atmosphere and Man. Prepared for the Division of Biology and Agriculture and the Division of Medical Sciences. Presented by Ellsworth Huntington, Chairman.

[4] Reprint and Circular Series of the National Research Council, No. 47. Reprinted from the *American Review of Tuberculosis*, August, 1923. "A Statistical Study of Tuberculosis Mortality in Colorado for the Thirteen Years 1908 to 1920." By Henry Sewall. Price 50 cents.

[5] Transactions of the National Association for the Prevention of Tuberculosis, 20, Hanover Square, London, W. 1, at the Ninth Annual Conference, the University, Edmund Street, Birmingham, July 12 and 13, 1923. Pp. xxii+301. London: George Pulman and Sons, Ltd., 24-27, Thayer Street, W. 1. 1923. Price 15s. 6d.

The City of Chicago Municipal Tuberculosis Sanatorium has favoured us with a copy of the bulky, comprehensive, generously illustrated, and informing Annual Report, which provides a detailed account of the various philanthropic activities and scientifically directed services which are being effectively carried out for Chicago's tuberculous cases.[1]

Miss E. Stevinson, Superintendent of the Rachel McMillan Open-Air Nursery School, has just issued an illustrated little volume containing a collection of picturesque, suggestive, and serviceable articles on Open-Air Nursery Schools for city children.[2]

Under the auspices of the British Spa Federation there has just been issued a practical guide-book to the spas of Britain.[3]

"Winter in Italy" and "Summer in Italy," published by the Italian State Tourist Department, are admirable guides for British visitors seeking health and recreation in Italy.[4] These volumes are beautifully illustrated, and with maps and informing letterpress supply just the guidance which the medical adviser and his patients require.

"The Peerless Riviera" is a charming handbook, with illustrations and maps, which should be in the hands of every health seeker visiting Riviera resorts.[5]

An illustrated article by Dr. C. P. Howard on "Pulmonary Syphilis" appeared in *The American Journal of Syphilis* for January.[6]

The Cancer Research Fund of Ireland has commenced the publication of a new quarterly, *The Journal of Cancer*.[7] It aims at providing a complete and accurate record of all the most recent developments of cancer work in regard to its cause, treatment, and cure. Dr. W. Pilger, in an article on "Deep X-ray Therapy," gives cases of tuberculosis in which good results were obtained.

"The Medical Annual" for 1924 has just been published, and will be noticed in our next number.[8]

[1] Report of the City of Chicago Municipal Tuberculosis Sanatorium. Central office: 105, West Monroe Street. Pp. 328, with numerous illustrations.

[2] "The Open-Air Nursery School." By E. Stevinson. With Introduction by Sir Michael E. Sadler. Pp. xi+79, with 3 illustrations. London: J. M. Dent and Sons, Ltd., 10-13, Bedford Street, W.C. 2. 1923. Price 2s. 6d. net.

[3] "The Spas of Britain." The Official Handbook of the British Spa Federation. For the use of the medical profession. With an Introduction by R. Fortesque Fox, M.D. Pp. xv+170. With map and illustrations. Printed by the Pitman Press, Bath.

[4] "Winter in Italy" and "Summer in Italy," together with an artistic collection of coloured pictures and notes on "The Health-giving Waters of Italy: Spas and Sea-Bathing Resorts," published by Ente Nationale Industrie Turistiche, can be obtained from the London offices at 12, Waterloo Place, Regent Street (Pall Mall end), S.W. 1.

[5] "The Peerless Riviera," edited by W. Bowman and E. G. S. Leadam, is published by the authority of the Southern Railway of England, Nord Railway of France, and Paris, Lyons, and Mediterranean Railway. Copies may be obtained at the offices of the Southern Railway, Victoria Station, S.W. 1. Price 1s. net.

[6] *The American Journal of Syphilis* is a quarterly journal devoted to the study and prevention of syphilis, and is published by the C. V. Mosby Co., St. Louis. Annual subscription, $7.80.

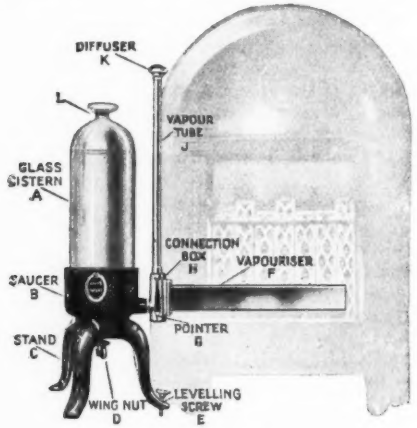
[7] *The Journal of Cancer* is issued quarterly by Alex. Thom and Co., Ltd., Dublin, for the Cancer Research Fund (Ireland), Hume House, Dublin. Price 2s. 6d. each number. Annual subscription, 10s., post free.

[8] "The Medical Annual" is published by John Wright and Sons, Ltd., Bristol. Price 20s. net.

PREPARATIONS AND APPLIANCES.

THE OXYNYDOR.

THE Yorkshire Steel Company, Ltd., the works of which are at Sheffield, have recently introduced a promising hygienic novelty under the name of THE OXYNYDOR.[1] The chief features of this ingeniously devised and cleverly constructed appliance is indicated in the accom-



THE OXYNYDOR.

panying figure. It is an invention which is now placed on the market under Holt's Patent, and deserves the consideration of all users of gas and electric fires. In so many artificially heated apartments the air rapidly becomes dry and the throat and nose and other respiratory passages consequently become parched and uncomfortable, and oftentimes headaches and general discomfort are induced. The Oxynydor, it is held, provides a satisfactory means whereby the air is moistened and purified: if desired it can be medicated or perfumed. The construction is simple, and in action it is automatic. We believe many patients will be glad to avail themselves of the advantages offered by the Oxynydor.

HYGIENIC AND THERAPEUTIC SPECIALITIES.

Messrs. E. T. Pearson and Co., Ltd., have just introduced a new series of organic iron preparations under the general designation of PROTOFERRIN Brand.[2] Protoferrin contains the equivalent of 9·65 per

[1] The Oxynydor is manufactured by the Patentees, The Yorkshire Steel Co., Ltd., and can be seen in action at their London Head Office and Showrooms, 30, Holborn, E C. 1. The price is, white enamelled, 40s.; black enamelled with nickel fittings, 35s. Full particulars on application.

[2] Particulars regarding the Protoferrin Iron Compounds can be obtained on application to E. T. Pearson and Co., Ltd., Mitcham, Surrey.

cent. metallic iron organically combined with the readily assimilable vegetable globulin Edestine. Whatever view is accepted regarding the pharmacology and therapeutic action of iron, there is no doubt it is of considerable service in the treatment of tuberculosis and anæmic and other derangements and disorders predisposing thereto. The Protoferrin compounds—a series of six are now available, and include combinations with arsenic, aloin, nux vomica, strychnine, and valerianate of zinc—are non-irritant, non-constipating, effective hæmatinics and tonics, and have a wide range of usefulness. They are supplied in tablet form in bottles of 50 and 100.

Messrs. John Bell, Hills, and Lucas, Ltd., are supplying an excellent and reliable series of Colloidal preparations, many of which will undoubtedly be of service in the treatment of tuberculous subjects. Special reference may be made to COLLOIDAL CALCIUM OLEATE ("Collobell" Brand).[1] This white opalescent liquid contains 1 in 1,000 of calcium oleate. It has been found serviceable in reducing night sweats and arresting hæmoptysis. Given with calcium lactate it is likely to be of value in preventing the development of chilblains in patients undergoing open-air treatment.

COLLOSOL FERROMALT is a preparation containing Crookes's colloidal iron with malt extract, and is an excellent therapeutic agent for tuberculosis and tuberculously inclined subjects, and especially anæmic and so-called strumous children.[2] The iron is present in a fine state of subdivision, is readily absorbed and assimilated, and gives rise to no undesirable disturbances. For cases in which there is a tendency to constipation a Collosol Ferromalt with cascara is available.

PULMO BAILLY is a pleasant and serviceable compound which is being extensively used in the hospitals, clinics, and dispensaries of the City of Paris as well as throughout France and abroad.[3] It is claimed that the preparations of calcium and phosphates which it contains are present in the ionic state and hence specially active and assimilable. Guaiacol is also a notable element. This syrup-like preparation has been found of considerable benefit in the alleviation of cough and associated symptoms arising in the course of pulmonary tuberculosis and other diseases of the chest.

CREO-TERPIN COMPOUND (Wampole) is a stimulant, expectorant, sedative, and deodorant, which, especially in Canada and the United States, is being extensively used for the alleviation of cough and the treatment of pulmonary tuberculosis and other affections of the lungs and respiratory passages.[4]

CRÉOSAL was discovered by MM. Dubois and Lecoq, and is a pure form of monoguaiaco-phosphate of calcium. It has found much

[1] Particulars regarding the "Collobell" Brand Preparations can be obtained on application to John Bell, Hills, and Lucas, Ltd., Oxford Works, Tower Bridge Road, S.E. 1.

[2] Particulars regarding Collosol Ferromalt and other Collosol Preparations of service in dealing with tuberculous cases can be obtained on application to the Crookes's Laboratories, 22, Chenies Street, Tottenham Court Road, W.C. 1.

[3] Pulmo Bailly is prepared in the Laboratoire A. Bailly, 15 and 17, Rue de Rome, Paris, VIII^e. The British agents are Dr. Bengué and Co., 52, Charlotte Street, W. 1.

[4] Particulars regarding Creo-Terpin Compound can be obtained from the manufacturing pharmacists, Henry K. Wampole and Co., Ltd., Perth, Ontario. The British agents are Francis Newberry and Sons, Ltd., 27, Charterhouse Square, E.C. 1.

favour in France for the treatment of pulmonary tuberculosis, bronchitis, and various catarrhal affections of the respiratory organs. Syrup Créosal (Dubois) is an elegant, palatable, soothing preparation containing 50 centigrammes of Créosal in each tablespoonful, and is undoubtedly of much service in relieving cough and also discomfort associated with inflammatory catarrhs of the respiratory passages.[1]

FAMEL'S SYRUP is a far-famed preparation containing soluble lacto-creosote together with phosphate of calcium, codeine, and aconite.[2] It has given excellent results in pulmonary tuberculosis. Creosote is one of the multitudinous agents which for many years has maintained its position as a serviceable agent in lung affections and bronchial troubles, and in the "Sirop Famel" it exists in a form which even the most sensitive patients readily tolerate.

IPECOPAN (Sandoz) is proving popular as an expectorant and sedative.[3] It consists of emetine hydrobromide and the hydrochlorides of the pure alkaloids of opium. It is available in solution, in tablets, and with malt-syrup.

SALICIN is a preparation which has given excellent results in the treatment of influenzal and rheumatic affections.[4] It is not a proprietary preparation, but a definitely affirmed B.P. product.

Iodine has long been recognized as a valuable agent in the treatment of many tuberculous cases. In the form of COLLOSOL IODINE OIL (Crookes), which is a 3 per cent. suspension of colloidal iodine in oil, which can be used for external application or may be administered internally. When applied to cutaneous surfaces it is rapidly absorbed, and does not stain, blister, or irritate.[5] It is useful as an inhalation in cases associated with bronchial catarrh. A special form of iodine in circular pastille shape has been introduced, and is particularly useful in the treatment of morbid conditions involving the mouth and throat.

BISMUTH-FORMIC-IODIDE COMPOUND or "B.-F.-I." is a powder consisting of iodo-bismuth anhydro-methylene albuminate, zinc sulphocarbolate, bismuth subgallate, powdered alum, boric acid, acetanilide, thymol, menthol, and eucalyptol.[6] It is an astringent, absorbent, analgesic, antiseptic preparation which forms an excellent dry dressing for abrasions or minor wounds, discharging sores, tender feet, chafing skin, sunburn, offensive perspiration, and the like. It will certainly be

[1] Syrup Créosal (Dubois) is prepared in the Laboratoires Laleuf, 49, Avenue de la Motte-Picquet, Paris, XV^{e}, and specimens and particulars can be obtained from the British representatives, The Anglo-French Drug Co., Ltd., 238A, Gray's Inn Road, W.C. 1.

[2] "Sirop Famel" is prepared by P. Famel, 20 and 22, Rue des Orteaux, Faris, and the British agents are Wilcox, Jozeau and Co., 15, Great Andrew Street, W.C. 2, from whom specimens and particulars can be obtained.

[3] Ipecopan is supplied by the Sandoz Chemical Co., Ltd., Bradford, Yorks, from whom particulars can be obtained. The London agents are John Bell and Croyden, Ltd., 50, Wigmore Street, W. 1.

[4] Literature on the subject is supplied by the St. Amand Manufacturing Co., Carnwath Road, Fulham, S.W. 6, and Salicin is obtainable from all wholesale druggists.

[5] Particulars regarding the Colloidal Iodine and other "Collosol" preparation may be obtained on application to the Crookes Laboratories (British Colloids, Ltd.), 22, Chenies Street, Tottenham Court Road, W.C. 1.

[6] Bismuth-Formic-Iodide Compound is made by H. K. Mulford Co., Philadelphia. The British agent is Charles F. Thackray, Great George Street, Leeds, and 119, High Holborn, W.C. 1.

of service in dealing with some of the lesions causing discomfort in tuberculous subjects.

LOTIO CALAMINÆ, manufactured in the laboratories of John Bell, Hills, and Lucas, Ltd., is a particularly fine pharmaceutical preparation of colloidal calamine and lead with glycerine, liquor picis carbonis and rose water.[1] It is flesh-coloured, and forms an ideal application for the skin, and particularly for congestive and inflammatory conditions involving face and neck. Patients undergoing open-air treatment and liable to erythema produced by exposure to sun or wind will find this elegant lotion of the greatest value.

BELL'S BEEF TEA is a new and reliable nutrient and stimulant, which will be appreciated in hospitals and sanatoria in the treatment of all forms of tuberculosis.[2] It is a restorative and appetizer which may well be given to delicate, unstable, and tuberculously inclined persons, and will be found excellent in hastening convalescence and maintaining strength in arrested cases. This concentrated food contains half its weight in the form of prime lean beef free from fat and in a readily assimilable form. It is free from preservatives.

Sir Leonard Rogers and others have during the last few years accomplished notable service in the treatment of leprosy by administration of sodium morrhuate. The success of this agent in leprosy has led to its use in tuberculous lesions. A number of observers have reported favourably. This preparation is on its trial. A reliable form is now being prepared by The British Drug Houses, Ltd., and sterilized solutions for injection are available in 1 c.c. ampoules: sodium morrhuate 3 per cent. with 0·5 per cent. phenol.[3]

In the January number of this *Journal* (p. 37) an illustrated notice was given of a new aspirator. Unfortunately the words "Artificial Pneumothorax" were introduced. It is obvious from the description that the apparatus is intended to be used as an aspirator and not for the introduction of gas into the chest. The apparatus has, indeed, nothing to do with pneumothorax.

[1] Lotio Calaminæ (Colloid) is supplied in 8 fluid-ounce bottles. Particulars from John Bell, Hills, and Lucas, Ltd., Oxford Works, Tower Bridge Road, S.E. 1.

[2] Full particulars regarding Bell's Beef Tea can be obtained on application to John Bell, Hills, and Lucas, Ltd., Oxford Works, Tower Bridge Road, S.E. 1.

[3] Particulars regarding the use of Sodium Morrhuate in tuberculosis, together with quotations regarding the preparation in powder form or in ampoules, can be obtained on application to The British Drug Houses, Ltd., 16-30, Graham Street, City Road, N. 1.

THE OUTLOOK.

TUBERCULOSIS RESEARCH.

TUBERCULOSIS is still shrouded in mystery. Since Koch's epoch-making discovery of the tubercle bacillus, an elaborate tuberculosis medical service has been evolved in this country, and it has been customary to speak and write as though our knowledge was so extensive and reliable that only adequate organization and sound administration were required to prevent a disease which medical officers of health and many others have continuously declared to be preventable. The fact is we are still far from understanding the etiology, pathology, symptomatology and therapeutics of tuberculosis. Much research is required if our knowledge is to be effectively extended. At present there is considerable difficulty in detecting with any approach to certainty the early symptoms of tuberculous disease. Research must not be restricted to the realm of the laboratory, but should extend to clinical and all sociological aspects of the problem. The recently issued "Report of the Medical Research Council" contains interesting particulars regarding the development of the National Institute for Medical Research and various original investigations in regard to specific subjects relating to tuberculosis.[1] There is now a tuberculosis committee of the Council of which Dr. A. S. MacNalty is the Secretary. One section is devoted to the "Study of the Bacteriology of Tuberculosis." Professor G. Dreyer is Chairman, and the members are Dr. R. G. Canti, Professor S. L. Cummins, Dr. A. Stanley Griffith, Dr. A. C. Inman, and Dr. A. S. MacNalty, who acts as Secretary. There is also a section considering "Tuberculin." Captain S. R. Douglas is Chairman, and the members are Mr. W. Buckley, Dr. L. S. T. Burrell, Professor J. B. Buxton, Professor G. Dreyer, Mr. J. Mackintosh, Dr. H. H. Thomson, Dr. P. C. Varrier-Jones, Dr. G. T. Western, Professor T. B. Wood, with Dr. A. S. MacNalty as Secretary. The statistical studies relating to tuberculosis are now being supervised by the Industrial Health Statistics Committee; heliotherapy comes within the scope of the Committee on the "Biological Actions of Light." A special Sub-Committee is also in charge of the trials which are being made of Professor Dreyer's diaplyte vaccine. The Report provides an abstract of the valuable bacteriological and serological studies which Dr. A. Stanley Griffith is carrying out under the Council at the Cambridge Field Laboratories. Reference is also made to the work which Miss C. M. Acland has undertaken in the tuberculosis department of the Welsh National School of Medicine at Cardiff, under Professor S. Lyle Cummins. In Professor J. M. Beattie's department at the University of Liverpool, Dr. F. C. Lewis has carried further the investigation regarding an electrical method of sterilizing milk infected with tubercle bacilli. Reference is made to a considerable number of other researches which are being pursued in various parts of the country. A section is devoted to vaccine therapy,

[1] "Report of the Medical Research Council for the Year 1922-1923." Pp. 143. London: His Majesty's Stationery Office, 1923. Price 3s. 6d. net.

and special mention is made of Professor Dreyer's "diaplyte" and the work of those who are investigating the action of this new vaccine. As regards any opinion as to the value or otherwise the following statement appears: "In the case of a disease such as tuberculosis, it will certainly not be possible to pronounce a definite verdict on a new form of treatment except after a period of long observation, but the Council will publish a preliminary series of reports as soon as possible, which will indicate whether or not the treatment is fulfilling the hopes which have been formed about it. In the meantime, it is necessary to make it clear that the treatment is still in a purely experimental stage, and that it would be entirely premature to attempt to make it generally available while its value remains uncertain, and while the proper methods of its use and the precautions to be observed have not yet been determined." A valuable series of investigations into chemotherapy in tuberculosis is referred to. Many will be specially interested in the views expressed regarding the biological actions of light and the results already obtained by Dr. Leonard Hill and Dr. Argyll Campbell. They find that "exposure of the head to light and heat rays from summer sun or carbon arc rapidly increases the temperature of the brain, although the blood temperature is not much altered," and it is stated also that "they have confirmed Sonne's results that light rays heat subcutaneous tissues more than do dark heat rays." These brief and necessarily incomplete references are sufficient to indicate that in this country many really promising researches are now in course.

THE CUTANEOUS TUBERCULIN TEST.

Professor S. Lyle Cummins in a recent article on the "Cutaneous Tuberculin Test,"[1] quotes Dr. Charles McNeil's method of carrying out the test:[2] "A small circular area of skin on the front of the forearm is chafed with the sharp point of a darning-needle until the epidermis is removed and the pink cutis vera exposed. Care is taken to avoid bleeding. The eye of the needle is now charged with undiluted old tuberculin, and pressed into the prepared vascular surface with a rotary motion. A small bruised pit is thus formed from which the tuberculin is rapidly absorbed." Professor Cummins then furnishes the following practical suggestions which may well be followed by tuberculosis officers desiring to carry out similar investigations and conduct the test under standardized conditions. "A means of limiting the excursion of the needle-point to a definite area was found in the Abel Morrall metal gauge for knitting-needles, an instrument obtainable for a few pence, consisting of a plate of metal perforated with a graded series of apertures by which knitting-needles are measured. Aperture No. 3 was found to be of suitable dimensions for the test. For use, the metal gauge was pressed firmly against the surface of the forearm of the patient, so that the skin bulged up slightly into the circular aperture. Over the area of skin thus fixed and delimited the

[1] See "The Cutaneous Tuberculin Test, Applied to a Series of Definitely Diagnosed Cases of Tuberculosis." By S. L. Cummins, C.B., C.M.G., M.D., David Davies Professor of Tuberculosis, Welsh National School of Medicine, Cardiff, and Principal Medical Officer, Welsh National Memorial Association. *British Medical Journal*, Feb. 2, 1924, p. 186.

[2] A full description appears in the *British Medical Journal* for April 21, 1923, p. 673.

point of the needle was worked until a circular patch of cutis was laid bare. The gauge was now removed, leaving a scarified area of standard size into which the tuberculin was rubbed after the method of McNeil. The needles used were 'Crescent' (sharp) carpet needles, which were chosen for their sharp points and capacious eyes, suitable for carrying and 'rubbing in' the charge of tuberculin. In each case a series of six scarifications were made, three on each forearm, with a view to employing five strengths of tuberculin and a control. The strengths of tuberculin used were as follows: 2, 4, 8, 16 and 32 per cent. These dilutions were prepared just before use by a 'drop method' suggested by Professor Dreyer, F.R.S., sterile normal saline solution being used as the diluent and also as the control fluid. This method is shown in the following table, published with the kind permission of Professor Dreyer:

TABLE INDICATING PROFESSOR DREYER'S TUBERCULIN DILUTION METHOD.

No.	Tuberculin.		Saline.	Dilution.	Strength (per Cent.) of Tuberculin.
1	1 drop	+	28 drops	1 in 4·4	2·02
2	2 drops	+	28 ,,	1 in 25·2	3·97
3	4 ,,	+	26 ,,	1 in 12·3	8·13
4	4 ,,	+	12 ,,	1 in 6·2	16·1
5	8 ,,	+	10 ,,	1 in 3·2	31·6

Saline to be dropped in first; dropping pipette cleaned and dried; tuberculin dropped in; saline and tuberculin carefully mixed, without violent shaking; same dropping pipette to be used for same series of dilutions. The dropping pipette used is that supplied for use in the Dreyer agglutination technique. The tuberculin dilutions should be made up freshly for each series of observations as alterations take place on keeping. In the usual methods of dilution in which measured volumes of tuberculin and diluting fluid are drawn up into a syringe or pipette, successive diminutions of concentration being obtained by further dilutions measured with the same instrument, there is a considerable fallacy, due to the retention of an indeterminate quantity of tuberculin on the inside of the syringe from the last concentration used. In Dreyer's method this error is entirely eliminated, a point of great importance where accurate comparisons of reactivity are sought. The tuberculin selected for the tests was P.T.O. (B.W. and Co.). Phials of this preparation, together with standard dropping pipettes and sterile salt solution, Morrall gauges and carpet needles, were provided for each institution, together with exact details of the technique to be employed. The results of the tests were read after twenty-four, forty-eight, and seventy-two hours, and on the fifth day."

EDUCATIONAL PROPAGANDA.

Tuberculosis is a medico-sociological problem, and in its solution all members of the community should co-operate. Medical service should be closely associated with well-organized and efficiently directed

educational propaganda. It is to be feared that under existing conditions in this country tuberculosis officers and the staffs of hospitals and sanatoria receive but little encouragement in undertaking systematic educational work among patients' relatives and others standing in need of enlightenment. It is worth considering whether the many tuberculosis dispensaries now existing in all parts of the country could not be equipped and conducted with a view to popular education regarding measures likely to assist in preventing and arresting the development

EDUCATIONAL PROPAGANDA IN ASSOCIATION WITH TUBERCULOSIS MEDICAL SERVICE.

of tuberculous disease. In the United States of America much well-devised educational propaganda is being carried out with conspicuous success. Through the courtesy of the Editor of the *New York Tuberculosis Association Bulletin*[1] we are permitted to reproduce the accompanying illustration, which provides a striking picture of the pictorial educational work, which can be associated with practical service.

POST-GRADUATE TUBERCULOSIS STUDY.

Tuberculosis is a problem which demands continuous study. During recent years new conceptions regarding the disease, improved methods for securing its early diagnosis, and more scientific measures for carrying out effective treatment have been developed. Tubercu-

[1] The *Bulletin of the New York Tuberculosis Association* is issued from the Headquarters, 10, East 139th Street.

losis officers, medical superintendents of hospitals and sanatoria dealing with tuberculous cases, and all medical advisers should be afforded opportunities for post-graduate study. In the Astor report on tuberculosis published in 1912, it was laid down that "tuberculosis officers should be afforded special facilities by the authorities by which they are appointed, enabling them to spend not less than one month every three years in attending post-graduate instruction." It has been generally recognized in the public services—*e.g.*, the navy and the army—that it is of advantage to the services to provide facilities for post-graduate study. The London County Council has recently considered the subject, and is of opinion that this principle might advantageously be applied to tuberculosis officers by affording them facilities for short periods of study. As a result, negotiations have been entered into with the authorities of certain institutions for tuberculous patients, several of which expressed their willingness to provide the necessary facilities. The Council has also addressed to the various Metropolitan Borough Councils a letter informing them that these facilities are now available, and that, subject to certain conditions, the Council would be prepared to admit as ranking for grant expenditure incurred by the Borough Council for the purpose. All interested in the advancement of knowledge regarding tuberculosis and the improvement of the existing tuberculosis service will welcome this decision, and we trust that local authorities throughout the country will follow the admirable lead of the L.C.C. in this matter.

NOTES AND RECORDS.

On March 3 the Ministry of Health issued a circular (479) containing the following regarding the treatment of cases of tuberculosis:

"I am directed by the Minister of Health to refer to paragraph 2 (*d*) of Circular 257, dated November 3, 1921, in which local authorities were advised that they should require a contribution towards the cost of the residential treatment of persons suffering from tuberculosis (other than ex-service men whose disease has been held to be attributable to, or aggravated by, war service) in cases where the financial circumstances of the patient were such as to justify a charge; but that it was important that nothing should be done which would be likely to deter persons who are in need of residential treatment from accepting such treatment, and that a charge should only be made in cases in which the authority were satisfied that the patient was in a position to contribute towards the cost of treatment. The Minister has received certain representations in regard to this matter, and he desires to impress upon local authorities that, in considering whether a patient is in a position to contribute towards the cost of treatment, they should have regard in each case to the question whether a charge should be made without detriment to the patient's ability to provide proper and adequate maintenance for himself and his dependents, and that no charge should be made unless they are satisfied on this point."

A scheme for the training of nurses in pulmonary tuberculosis has been elaborated by the Society of Superintendents of Tuberculosis Institutions. It includes all work required by the General Nursing Council for its preliminary examination, and, in addition, provides for further experience in certain special departments. The syllabus is

practical and comprehensive. The examination for the society's certificate will be held in May and November. Trained nurses must present evidence of having had a year's course in tuberculosis nursing and probationers a two years' course.[1]

The Society of Superintendents of Tuberculosis Institutions has also recently issued a scheme for the classification of cases of tuberculosis.[2]

The summer examination for the tuberculous diseases diploma (Wales) will be held at Cardiff on June 2, 3, and 4, instead of in the first week in July as on previous occasions. Notice of candidature, together with the entrance fee and the necessary certificates, should be forwarded to the Registrar of the University, University Registry, Cathays Park, Cardiff, not later than April 15.

At the Hospital for Diseases of the Chest, Brompton, London, S.W. 3, a short intensive course of instruction, extending over a week, will be held in the X-ray department with special regard to the needs of medical officers of tuberculosis sanatoria, and beginning April 7. Facilities will be given to those taking the course to see the practice of the hospital, including out-patients, in-patients, artificial pneumothorax department, compressed air bath, and the various special departments. The fee for the course is £5 5s.

The Tenth Annual Conference of the National Association for the Prevention of Tuberculosis will be held in London on Thursday and Friday, July 3 and 4. The main subject for consideration will be "The Part played by Training Colonies in the Treatment of Tuberculosis." The conference will take the form of a practical demonstration of the work carried out at the training colony founded and maintained by the National Association at Burrow Hill, Frimley. This will be followed by a discussion opened by Dr. Macpherson, the medical superintendent, who has been associated with working colonies for fifteen years. The Burrow Hill Training Colony, Frimley, Surrey, projected by the association, is included in the scheme of the Ministry of Pensions, and has sixty places for the treatment and training of tuberculous ex-service men who have already received sanatorium treatment. The courses of training comprise: (*a*) Carpentry; (*b*) Market Gardening, Poultry, Pig, and Bee Keeping, including light farm work. There is also a sanatorium block of twenty additional beds. Arrangements will be made for the conveyance of members of the conference from London to the colony. The discussion will be continued in London on the second day (Friday, July 4) at the Robert Barnes Hall, 1, Wimpole Street, W. 1. The subject of training colonies is at the present time occupying the minds of many local authorities, who, it is thought, will probably welcome the opportunity of observing a training colony at work, and of joining in a practical discussion regarding methods and results. The conference is open to all bodies concerned with tuberculosis and to all other interested persons. The membership fee is one guinea, and this includes transport from London to Frimley and back, entertainment at the colony, and report of proceedings.[3]

[1] Further particulars can be obtained from the Hon. Secretary of S.T.I., Dr. P. W. Edwards, Cheshire Joint Sanatorium, Market Drayton, Salop.

[2] Particulars of the scheme were published in *Tubercle* for February, and details can be obtained on application to the Hon. Secretary, Dr. P. W. Edwards, Cheshire Joint Sanatorium, Market Drayton, Salop.

[3] Full particulars may be obtained on application to the Secretary, Miss Freda Strickland, 20, Hanover Square, W. 1.

The Fourth Conference of the International Union against Tuberculosis will be held at Lausanne, Switzerland, on August 5, 6, and 7. Among the subjects for consideration are the following: "Can one find in Nature, or Create Artificially, Saprophytic Forms of Koch's Bacillus which might be Susceptible to take the Form of the Virulent Tuberculous Bacillus?" "The Relations between the Pregnant State and Tuberculosis"; "Effects of the Organized Antituberculous Fight in Various Countries on the Diminution of Tuberculous Mortality." Among those taking part in the conference are Professor Sir Robert Philip, Professor Calmette, Professor Sahli, Professor Forssner, Professor Bernard. At the close of the conference on Friday, August 8, a tour will commence, in the course of which the principal tuberculosis stations of Switzerland will be visited, including Leysin, Montana, Heiligenschwendi, Bern, Zurich, Davos, and Arosa. The tour will last about eight days.[1]

A Post-Graduate Course of Lectures on Tuberculosis will again be held at Davos in Switzerland, August 25-31. It is probable that in connection with this gathering an excursion to Arosa will be arranged. No doubt many taking part in the International Tuberculosis Conference at Lausanne will desire to visit Davos and Arosa.

Dr. Rollier and his staff now find themselves so overwhelmed by the visits of medical men and women from all parts of the world seeking information regarding the methods practised at Leysin that in justice to their patients and to all departments of the work they have been compelled to make special arrangements for the reception of medical visitors. In future, members of the medical profession will be welcomed only on Tuesdays and Fridays, and it is hoped that doctors desiring to visit the Rollier clinics at Leysin will make special note of these days, when special arrangements will be made for their reception. Dr. Rollier will hold his customary course of Post-graduate Lectures and Demonstrations at Leysin this summer after the meeting of the International Union against Tuberculosis at Lausanne, and extending from August 18-23. All participating in the course should arrive in Leysin on August 17. There is no fee, and arrangements for board and lodging will be made at a nominal charge of 10 francs a day. All desirous of attending the course should communicate with Dr. Rollier's secretary at Les Frênes, Leysin Village, Switzerland.

The Lettsomian Lectures on "The Treatment of Pulmonary Tuberculosis," delivered before the Medical Society of London by Dr. R. A. Young, provide a comprehensive review of present-day methods of treatment.[2]

In connection with the "coming of age" celebrations of the Heritage Craft Schools at Chailey, there will be a Festival Dinner at the Savoy Hotel, London, on May 21, when Dr. A. Rollier, of Leysin, will be the medical guest of honour.

[1] All particulars regarding the Fourth Conference of the International Union against Tuberculosis may be obtained on application to the Secretary, IV^e^ Conférence de l'Union Internationale contre la Tuberculose, 16, Place Saint-François, Lausanne, Switzerland.

[2] For reports of Dr. R. A. Young's three lectures see *Lancet*, February 23, March 8 and 22.